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BELIZE



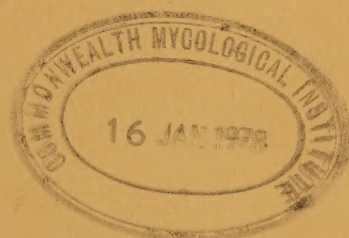
ANNUAL REPORT

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DEPARTMENT OF AGRICULTURE

for the year



1972

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Harvesting of the 1971/72 crop commenced at the Libertad Factory on 5th December, 1971 whilst operations at the Lower Hill Factory commenced on January 10th, 1972. The Lower Hill Factory was forced to shut down on several occasions in January due to lack of raw supplies caused by heavy rains. Following the improvement in the weather, harvesting continued without interruption, although excessive sprouting of cane resulted in the closing down of the factories. This was also witnessed in the Central district in May when for a short period, restrictions were placed on the delivery of burnt cane.

On 3rd February, the Lower Hill factory ceased on 5th June, having yielded 20,464 tons of sugar, surpassing the 1971 total by some 1,700 tons. On 1st September, the Libertad Factory ceased on 19th July, having yielded a little over 32,000 tons. A record production of 29,400 tons of sugar was also achieved, surpassing the 1971 total by more than 2,000 tons.

PART I - GENERAL REVIEW OF THE COUNTRY

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ANNUAL REPORT OF THE DEPARTMENT OF AGRICULTURE

FOR THE YEAR 1972

Part 1: GENERAL REVIEW OF AGRICULTURE

A. WEATHER CONDITIONS:

Weather conditions in general were considered favourable, although rainfall was above average. At Central Farm rainfall in January was double the ten year average. The period from March to June had below average rainfall. Nevertheless, the dry season was not severe. July was exceptionally wet, 25.2 inches of rain being recorded at Central Farm. Some flood damage was reported in the Belize and Sibun river valleys. The normal short dry spell in August did not materialise. Rainfall in December was above average and accompanied by a series of cold fronts which swept across the country. The Belize, Sibun and Monkey Rivers received some 9.5 inches of rainfall in their upper reaches between the 16th and 19th December. Some damage was reported from the subsequent floods.

Rainfall varies considerably from district to district and from month to month on a localised pattern. Thus in January the highest rainfall for the month was recorded at Maskall (11.62 inches) and the lowest at Corozal (2.76 inches). The variation can be considerable over much shorter distances as shown by the June and July rainfall returns for Central Farm and San Ignacio (a distance of no more than five miles). The former reported 4.18 inches and 25.2 inches respectively for June and July whilst the latter reported 7.13 inches and 20.83 inches respectively. Details of rainfall distribution for individual stations are contained in Appendix 1 of this report.

The highest temperature reported was 102°F in May at the Yo Creek Agricultural Station whilst the lowest temperature reported was 49°F in February at Cooma Cairn, Mountain Pineridge. The average monthly maximum and minimum temperatures recorded at the various meteorological stations are contained in Appendix 2.

B. EXPORT CROPS:

Sugar Cane

Harvesting of the 1971/72 crop commenced at the Libertad Factory on 6th December, 1971 whilst operations at the Tower Hill Factory commenced on January 10th, 1972. The Tower Hill Factory was forced to shut down on several occasions in January due to lack of cane supplies caused by heavy rains. Following the improvement in the weather, harvesting continued without interruption, although excessive amounts of burnt cane resulted in the slowing down of the factories. This was most pronounced in the Corozal district in May when for a short period, restrictions were placed on the delivery of burnt cane.

Grinding operations at the Tower Hill factory ceased on 8th June, having lasted for 22 weeks. A record production of 30,464 tons of sugar was achieved at Tower Hill surpassing the 1971 total by some 1,500 tons. Grinding operations at the Libertad Factory ceased on 19th July, having lasted a little over 32 weeks. A record production of 39,503 tons of sugar was also achieved, surpassing the 1971 total by more than 3,500 tons.

Table 1. Sugar Production Data, 1972

	<u>Tower Hill Factory</u>	<u>Libertad Factory</u>	<u>Total 1971/72</u>	<u>Total 1970/71</u>
Cane deliveries (long tons)				
Cane Farmers	127,579	278,597	406,186	364,551
Company	<u>175,207</u>	<u>86,271</u>	<u>261,478</u>	<u>268,078</u>
TOTAL	302,786	364,868	667,654	632,629
Sugar Production (long tons)	30,464	39,503	69,967	64,851
Molasses Production (long tons)	11,115	13,406	24,521	22,960
Tons Cane/Tons Sugar ratio				
Farmers Cane	9.76	9.21	--	--
Company Cane	10.07	9.32	--	--
Weighted Average	9.94	9.24	9.54	9.76

Exports of sugar in 1972 totalled 67,258 tons, or some 8,600 tons more than the previous record shipment made in 1970. Molasses exports totalled 21,835 tons. The total export earnings during 1972 were estimated at \$17.8 million. In addition more than 3,500 tons of sugar were sold locally. The total final price paid to farmers for cane delivered in the 1971/72 season is the highest on record. This was due mainly to the increase in the U.S. Sugar Quota for Belize (the highest priced guaranteed market for Belizean sugar) and the high level that the world free market price for sugar maintained throughout the year.

During the year the transfer of lands from Belize Sugar Industries Limited to cane farmers was completed. B.S.I. Limited retains a 1,000 acre unit for research purposes. Some froghopper damage was reported in the Corozal District in September. It was also observed that the pests were more prevalent in fields planted to the P.O.J. cane variety.

Citrus

During the 1971/72 crop season (July 1st to June 30th) a record number of boxes of fruit were delivered to the two processing factories. A total of 1,315,166 contract boxes were delivered consisting of 421,049 boxes of grapefruit and 894,117 boxes of oranges. A further 90,081 contract boxes of oranges were carried over into the 1972/73 crop due to the scarcity of pickers towards the end of the season.

The following data indicates the distribution of processing carried out by Salada Belize Limited and the Citrus Company of Belize Limited.

Table 2. Distribution of Processing of 1971/72

	<u>Citrus Crop</u>			
	<u>Salada</u>	<u>CCB Ltd.</u>	<u>Total 1971/72</u>	<u>Total 1970/71</u>
Orange (boxes of 90 lbs. net each)	499,543	394,574	894,117	894,662

Grapefruit (boxes of 80 lbs. net each)	205,607	215,442	421,049	375,851
Total Citrus (contract boxes)	705,150	610,016	1,315,166	1,300,513

Exports of citrus products during 1972 were as follows:-

Table 3. Exports of Citrus Products, 1972

<u>Product</u>	<u>Quantity ('000 Lb.)</u>	<u>Value (\$000)</u>
Orange Juice	5,967	706
Grapefruit Juice	1,193	119
Orange Concentrate	6,330	2,112
Grapefruit Concentrate	695	259
Grapefruit Segments	3,204	658
Orange Oil	136	109
Grapefruit Oil	2	1
Fresh Fruits	4,034	324
TOTAL	21,561	4,287

The citrus processors bought grapefruit from producers at an advance price of \$1.35 per contract box for processing. Suppliers of grapefruit for fresh fruit exportation received a total of \$5.00 per contract box. Oranges fetched an advance price of \$1.25 per contract box. A cess of 6 cents was deducted from the price of each contract box of fruit delivered, this cess being used to finance operations of the Citrus Growers Association including the Association's contribution to the Citrus Research Scheme.

The incidence of premature fruit drop and Mexican fruit fly continued to be of concern to producers and the work of the Citrus Research Unit centred on the evolution of effective and economic control measures for the same.

Cucumbers and Sweet peppers

Two commercial firms, Belize Offshore Growers Limited and Savannah Products Limited continued to produce cucumbers and other vegetable crops for export to the U.S.A. winter market. The area cultivated was much reduced from the 1970/71 crop and only some 2 million lbs. of cucumbers were exported for the 1971/72 crop. In addition some 100,000 lbs. of sweet peppers were exported by the Companies. Additional experimental plantings of other crops for export were made during the year. The results, however, were not encouraging.

The Hattleville Farmers Cooperative continued to produce for export limited quantities of sweet peppers during the year.

Papaya

The processing plant at Shipyard processed fruit for eleven months of the year. During the year a total of 469,500 lbs. of fresh papaya were processed into a diced dehydrated product for export. The processing plant at Blue Creek was closed for the whole year primarily due to a breakdown in marketing arrangements.

Bananas

Further efforts were made during the year to rehabilitate the banana export industry. Considerable progress was made in discussions with the potential marketing agents for the crop. A nursery of about 60 acres was established in December. It is envisaged that the acreage under bananas will expand to 4,000 acres by 1975.

Cocoa

Caribbean Investments Limited and Roaring River Estate continued to be the only producers of cocoa in the country. During 1972 further rehabilitation work and maintenance was carried out on the existing plantations. A total of 16 tons were exported.

C. FOOD CROPS:

Rice

An estimated 10,945 acres of rice were planted during the year. The acreage harvested was slightly lower due to the differing acreage of crop in the ground at the beginning and end of the year at Big Falls Ranch. A total crop of 12,700,000 lbs. of paddy was harvested. The distribution of total acreage of the crop according to districts can be seen from the table below:-

Table 4. Distribution of Rice Production by Districts, 1972

<u>District</u>	<u>Acreage</u>	<u>Acreage Mechanised</u>
Corozal	152	-
Orange Walk	358	291
Belize	6,046	5,526
Cayo	533	175
Stann Creek	64	-
Toledo	<u>3,792</u>	<u>872</u>
TOTAL	<u>10,945</u>	<u>6,864</u>

The acreage under mechanised rice increased considerably during 1972, in particular in the Toledo District where several small farmers took advantage of the Department's mechanical services together with credit from the Agricultural Credit Fund. These ventures were moderately successful.

A large part of the total production continues to be in the hands of shifting cultivators who use traditional production techniques and, consequently, obtain lower yields. There has been a slight shift out of rice production in parts of the Toledo district as some farmers returned to corn production.

Big Falls Ranch Limited harvested two crops during the year and the spring crop was again planted in November/December. Yields achieved have been somewhat lower than originally anticipated. Prospects for 1973 are much improved as a consolidation programme is being undertaken and no further land clearing is to be done until this has been carried out. Belize became self-sufficient in rice during 1972 and a trial shipment was made to Jamaica towards the end of the year.

The rice purchases by the Marketing Board for the last three years' crops are shown in the table below:

Table 5. Marketing Board Purchases of Rice Paddy
(lbs) 1970 - 1973

<u>District</u>	<u>1972/73</u>	<u>1971/72</u>	<u>1970/71</u>
Orange Walk	81,170	73,816	56,884
Belize	480,665	582,075	255,715
Cayo	8,360	920	-
Stann Creek	-	22,639	25,648
Toledo	<u>4,644,377</u>	<u>4,305,513</u>	<u>4,999,553</u>
TOTAL	<u>5,214,572</u>	<u>4,984,963</u>	<u>5,337,800</u>

Maize

It was estimated that 27,320 acres of maize were planted during 1972, from which approximately 36,600,000 lbs. of dried grain were harvested. The distribution of the total area planted according to districts is shown below:-

Table 6. Distribution of Corn Cultivation by District,
1972

<u>District</u>	<u>Acreage Planted</u>	<u>Acreage Mechanised</u>
Corozal	2,638	444
Orange Walk	12,160	6,458
Belize	867	114
Cayo	7,015	2,276
Stann Creek	285	-
Toledo	<u>4,355</u>	<u>-</u>
TOTAL	<u>27,320</u>	<u>9,292</u>

The Mennonites in the Orange Walk and Cayo Districts continue to play a dominant role in corn production, accounting for more than 90% of the acreage under mechanical cultivation.

Red Kidney Beans

The 1971/72 Red Kidney beans crop was affected by Tropical Storm 'Laura' in November, 1971. Planting was delayed by this storm and a slightly reduced acreage was eventually grown. Some 5,046 acres were planted and an estimated 2.05 million lbs. of dry beans were harvested. Beans were marketed at BH\$16.00 to \$24.00 per 100 lbs. The Marketing Board introduced a dual price structure for this crop. A contract price of 19¢ per lb. was established. All other purchases were guaranteed at a minimum of 16¢ per lb. The Marketing Board purchased 346,017 lb. of beans from this crop. Planting for the 1972/73 crop commenced in September for the seed multiplication crop and in December for the main crop. By the end of the planting season 5,086 acres had been planted for harvesting in early 1973.

Other Pulses

Some 30,000 lbs. of black beans were harvested early in the year. A total of 260 acres were planted between September and the end of the year for harvesting in 1973. A total of 175 acres of peanuts were planted during the year mainly by the Mennonites in the Orange Walk district. The entire crop is consumed locally.

Other Grains

During the year 480 acres of grain sorghum were planted by the Mennonite communities to supplement the feed grain supply. In addition some 40 acres of Broom corn were planted in the Corozal District.

Root Crops

Root crops such as yams, cocoyams, cassava and sweet potatoes were grown for local consumption, mainly on small plots of less than one acre. The total harvested for the year was estimated at 58,250 lbs. The monthly supply data is shown in the table below.

Plantains and Bananas

The supply of plantain and bananas for domestic consumption was restricted during the early part of the year as a result of the damage caused by Tropical Storm 'Laura'. During the year a total of 52,300 bunches were harvested for the local market. The monthly data is shown in the table below. Corozal and Stann Creek districts are the major areas of production.

Vegetables

Local production of vegetables continued to be supplemented by importations from Mexico and Guatemala. Domestic production is primarily based on tomatoes and cabbage supplemented by sweet pepper, cucumber and lettuce. The main producers are the Mennonite communities in the Orange Walk and Cayo districts and small farmers in the Macaw Bank area of the Cayo district and along the Sibun river in the Belize district. Monthly supply data is shown below.

Table 7. Domestic Production of Specified Fruits and Vegetables - 1972

	Root Crops (lbs)	Plantains & Bananas (bunches)	Vegetables (lbs)	of which Tomatoes (lbs)	Cabbage (lbs)
January	6,485	1,890	31,900	13,900	12,600
February	6,195	1,310	27,150	11,750	11,250
March	6,125	1,770	39,600	16,480	20,285
April	7,100	1,720	21,050	17,900	2,400
May	3,975	2,365	21,300	18,660	1,500
June	5,155	3,975	5,850	3,850	750
July	2,640	5,050	7,500	6,000	300
August	4,180	8,050	9,700	5,450	-
September	1,125	6,050	14,250	8,750	1,450
October	1,230	6,020	16,800	10,250	1,720
November	3,630	7,330	19,350	12,000	2,150
December	<u>5,835</u>	<u>6,770</u>	<u>10,600</u>	<u>5,150</u>	<u>1,950</u>
TOTAL	<u>58,250</u>	<u>52,300</u>	<u>225,050</u>	<u>130,140</u>	<u>56,355</u>

Other Crops

Production of watermelons is seasonal and is based in the Orange Walk and Cayo districts. Some 525,000 lbs were harvested for sale during the year.

Considerable quantities of avocados, mangoes, cashew nuts and a wide variety of other fruits are grown for the local market mainly on small holdings. The lack of organized production and marketing, however, makes it extremely difficult to get reliable estimates of production of such crops.

D. LIVESTOCK INDUSTRY

Beef Production

Without doubt the highlight of the year was the approval of Belize Meat Packers' abattoir for the export of beef to the United States. This now focuses the attention on the critical aspect of supply. A cattle census was initiated at the end of the year in conjunction with a revision of the register of brands. This should provide much needed information on the increase and movement of the cattle population during the past two years. There is, however, sufficient indication that although there have been relative changes in the distribution of cattle, the net increase in population will be much less than had been hoped for earlier in the year.

Domestic consumption of beef continues to increase. The number of stock slaughtered increased but the average carcass weight declined. Permits were given for the slaughter of 1,430 female cattle compared to 1,072 in the previous year.

Table 8. Consumption of Beef 1969 - 72.

<u>Year</u>	<u>No. of Animals Slaughtered</u>	<u>Total Dressed Weight (lbs)</u>	<u>Average Dressed Weight (lbs)</u>
1969	3,081	960,650	312
1970	3,310	1,045,517	316
1971	4,390	1,500,304	342
1972	5,004	1,693,504	338

A detailed breakdown of slaughterings can be obtained from Appendix 111 of this report.

Many of the factors affecting the development of the livestock industry, and especially beef production, are of common concern to government, producers, processors and consumers. As such the formation of a body to provide for joint consultation came under discussion during the year. No firm decision has yet been made.

Milk Production

Little development of the dairy industry has occurred during the year. Most of the fresh milk is produced by the Spanish Lookout Mennonite community in the Cayo district. Pasteurised milk is supplied to Belize City and Belmopan from the dairy at Spanish Lookout. Some milk is used to make butter and cheese mainly for consumption by the community itself. Improvements have been made to the Central Farm dairy operation.

The country continues to import considerable quantities of dairy products. The development of a dairy industry based on small scale national producers is not actively encouraged by the Department at this time. There is a lack of adequate management expertise, capital and breeding stock within the country for such a development.

Pig Production

Although it is difficult to make any firm estimate of the national pig population, there can be little doubt that numbers have declined during the year in response to the growing scarcity and rising price of corn. Consumption of pork has risen considerably during the past few years. This has been met by an increase in both slaughter numbers and average slaughter weights. The low average carcass weights for Belize Municipal and Toledo however (64 lbs. and 67 lbs. respectively) reflect the continued low level of husbandry in these districts.

Table 9. Slaughter of Pigs - 1969 - 1972

<u>Year</u>	<u>Number of Pigs Slaughtered</u>	<u>Total Dressed Weight (lbs)</u>	<u>Average Dressed Weight (lbs)</u>
1969	5,602	418,960	75
1970	6,542	448,413	69
1971	8,526	729,125	85
1972	9,902	891,123	90

The future expansion of the pig industry will depend on the availability of adequate supplies of feed (primarily corn) at economic prices.

Sheep and Goat Production

There is continued interest in sheep and goats but numbers remain small. The internal market is expanding and export prospects are good. Milk goats imported by the Heifer Project and private individuals appear to be doing well.

There are only a handful of substantial sheep flocks in the country which survive surprisingly well under minimal standards of husbandry. Experience within the Department and Belize Sugar Industries Limited with Suffolk and Hampshires respectively has shown that improved breeds can be maintained given good management. Routine immunisation and control of parasitism are essential factors if sheep production is to develop.

Poultry Production

As in the case of pigs the expansion of poultry production has been affected by the seasonal scarcity and rising cost of corn. The seasonal decline in egg production towards the end of the year was more severe than last year. This was brought about by a shift in production from eggs to broilers which involves a quicker turnover of investments. Eggs were imported to make up the deficit in supply.

The broiler industry expanded from a production of 0.8 million lbs. in 1971 to about 1.25 million lbs. of dressed meat in 1972. The rate of expansion was greatest during the first six months. The number of chicks hatched fell sharply in August and rose again slowly through November. A record number of 68,700 chicks were hatched in December at Spanish Lookout.

Apiculture

Honey production continues to be concentrated in the Northern districts of Corozal and Orange Walk. There have been increases in the number of beekeepers, apiaries and hives during the year. The distribution of these as at 31st December, 1972 is given in the table below.

Table 10. Distribution of Apiaries, Hives and Beekeepers at 31st December, 1972

<u>District</u>	<u>No. of Apiaries</u>	<u>No. of Hives</u>	<u>No. of Beekeepers</u>
Corozal	48	1,135	26
Orange Walk	79	1,628	56
Belize	12	173	4
Cayo	7	164	7
Stann Creek	6	127	2
Toledo	2	64	2
Total	<u>154</u>	<u>3,291</u>	<u>97</u>

The production of honey in 1972 was below that of the previous year due in part to less favourable weather conditions and also due to the production of nuclei for the additional hives established.

Table 11. Honey Production and Exports, 1968 - 1972

<u>Year</u>	<u>Honey Production (lbs)</u>	<u>Honey Exports (lbs)</u>
1968	468,158	397,720
1969	112,964	109,760
1970	107,447	92,400
1971	229,672	206,573
1972	184,951	177,400

There is a largely untapped potential for honey production and it is expected that more producers will take advantage of the continued rising world price for honey. During the year honey was exported to the United Kingdom at prices ranging between £135 and £195 per long ton. A total of more than 79 tons were released for export during the year. Agreement has been reached with the buying agents that the 1973 price will be £250 per long ton for the first 25 tons with the prospect of higher prices thereafter.

E. ANIMAL HEALTH

The country remained free of any major outbreak of disease until blackleg struck in the Cayo district just before the end of the year. This provided producers with their first experience of a major disease outbreak. Other diseases encountered for the first time during 1972 included atrophic rhinitis in pigs and blackhead in turkeys.

Vesicular Diseases

Foot and mouth disease remains the greatest hazard to livestock industries in Central and North America. Consultations have been held with USDA Liaison personnel in Central America in coordinating the national programme with others in the region. Meanwhile, vesicular stomatitis continues to be of immediate concern, primarily because it restricts export markets. A further minor outbreak occurred in 1972, involving four farms but there were no deaths. All recorded outbreaks have been of the New Jersey type although recent serological evidence shows that there is exposure of both New Jersey and Indiana type.

Swine Fever

An outbreak of swine fever in June linked sickness in pigs in the Belize district with a farm in the Orange Walk district where pigs had been undergoing treatment for a nonspecific disease for some time with no suspicion of swine fever. The postmortem examination of one chronic case suggested swine fever although the pathological examination was inconclusive. Meanwhile, more or less typical cases occurred in Orange Walk town. Control measures, including quarantine control of movement, serum to in-contact herds and area vaccination, were successful and there was no further spread.

Rabies

No outbreak of rabies occurred in 1972. Mass vaccination of dogs was continued by the Health Department.

Atrophic Rhinitis

The first recorded cases of this condition in the country appeared at Central Farm. Six piglets of a litter of ten from an imported Large White Sow showed clinical evidence. The affected piglets were slaughtered and the sow subsequently died of pneumonia. No other cases have appeared.

Equine Encephalitis

Vaccination of horses continued and by the end of 1972 a total of 3,482 vaccinations had been carried out on an estimated population of 5,750 horses.

Screening of horse sera for encephalitis antibodies was carried out by the University of Connecticut. The results gave evidence of widespread exposure to several encephalitis viruses, notably Venezuelan Equine Encephalitis (presumably an endemic strain).

Blackleg

As mentioned above, the first recorded outbreak of blackleg occurred in the Cayo district at the end of the year. Unfortunately the owner of the herd in which the first cases arose was uncooperative. Eventual diagnosis was followed by a widespread vaccination programme which was still underway at the end of the year.

Tuberculosis

No clinical cases were encountered. Cases recorded at meat inspection were 3 cattle out of 5,000 and 15 pigs out of almost 10,000.

Tuberculin testing of cattle at Spanish Lookout and Central Farm showed two reactors occurring in cattle previously tested in 1971 at Spanish Lookout.

Brucellosis

Most of the dairy cattle at Central Farm and Spanish Lookout were tested for brucellosis. Of 293 cattle one positive reactor was noted and isolated at Central Farm. At subsequent calving Brucella was isolated from the uterine discharge.

Anaplasmosis

During 1972, this condition caused considerable trouble in exotic cattle at Central Farm and elsewhere. Vaccination has not been notably helpful, but it is hoped to effect better control by a combination of vaccination, earlier diagnosis and low level antibiotic administration to replace the high level antibiotic therapy which tends to produce a pendulum effect. During the year under review anaplasmosis appeared to entirely overshadow babesiosis.

Virus Pneumonia of Pigs

The outbreak at Central Farm recorded in 1971 continued to give trouble through much of 1972. It was gradually eliminated as a clinical condition by selective slaughter.

Blackhead in Turkeys

This disease was first recorded in turkeys near Central Farm and shortly afterwards from turkeys in the Belize District. No connection was established. The low incidence of the disease may be attributed to local factors unfavourable to the life cycle and transmission of the disease.

Plant Poisoning

Plant poisoning undoubtedly occurs but presents considerable problems in differential diagnosis. It is usually only tentatively diagnosed on circumstantial evidence. It is hoped to follow up collections and identifications made by the Land Resources Division team to obtain more background information on the distribution of poisonous plants and the potential hazard to stock.

Laboratory Services

A substantial improvement in laboratory services was effected during the year under the guidance of Dr. Dale, the Veterinary Investigations Officer. Total examinations performed during 1972 were 1,660. A considerable proportion of these being faecal examinations in part due to the initiation of a helminth survey. An investigation is being conducted into the prevalence of leptospirosis in dogs, humans and rats in Belize City. Assistance in examinations of samples was received from the Pan American Zoonosis Centre in Argentina.

Details of disease found at meat inspection, clinical cases and laboratory examinations carried out during 1972 will be found in Appendix IV.

PART 11

Work of the Department

A. POLICIES

During the year under review, the basic policies of the Department remained unchanged and comprised mainly:-

1. conducting research on crops and livestock which are of economic importance to the country;
2. disseminating the results of experimental research to farmers through the extension services;
3. encouraging farmers to adopt modern production techniques to improve their productivity;
4. providing mechanised services to farmers at subsidized rates;
5. assisting farmers to increase their production of crops and livestock products to enable the country to attain self-sufficiency in food and to develop export surpluses of those products in which we possess a comparative advantage.

B. AGRICULTURAL RESEARCH

Crops Research

CORN

1. Variety Testing

AC 72-4. Seven varieties were planted during the dry season at Central Farm in 30 inch rows and 12 inch plant spacing. These were Pioneer X-306, Poey T-66 (hybrids), Arlequin, Cool Shade, Sintux, Tequisate and VS 550 (synthetics). Early varieties were Pioneer, Poey, Sintux and Tequisate (75 days to 50% silking) while later varieties were Cool Shade and VS 550 (88 days to 50% silking). Varieties from shortest to tallest were: Sintux (120 cm), Pioneer (139 cm), Poey (159 cm), Arlequin and Tequisate (182 cm) and lastly Cool Shade and VS 550 (221 cm).

With dry season planting, Sintux (a white corn) was expected to produce highest yields. Table 12 indicates % fertility, average ear weight, and grain as percent of ear for 12 inch plant spacing.

Table 12. Fertility as ears over plant stand in %, average ear weight (oz) and grain as percent of ear for each of seven corn varieties. (March 11 to July 17, 1972).

	Arle- quin	Cool Shade	Pioneer	Poey	Sin- tux	Tequi- sate	VS 550
Fertility %	52	42	37	50	75	50	44
Ear Weight	3.0	2.1	2.3	3.0	3.5	1.9	2.1
Grain as %	75	70	73	75	80	75	70

AC 72-14. Eight corn varieties, Cool Shade, Sintux, Tequisate, VS 500 (synthetics), H 02, H 88, Pioneer and Poey T-66 (hybrids) were tested during the summer (June 19 to September, 1972). Percent lodging and grain weight (Table 13) indicated that the highest yielding variety was Poey T-66 followed by Sintux, then by Pioneer X-306.

AC 72-16. A nursery with 23 Poey varieties was planted on September 22nd, 1972. Visual observations indicated that Poey T-66 and Poey R 2509 x 2541 were performing best. So, to date the hybrid adapted best to our conditions is Poey T-66.

Table 13. Percent lodging and grain weight for each of eight corn varieties grown at Roadside, Central Farm (June to September, 1972)

	Lodging	Grain Weight (oz)
Cool Shade	75	3.6
Sintux	23	5.6
Tequisate	28	5.0
VS 550	83	2.2
H 02	17	2.8
H 88	18	2.7
Pioneer X 306	12	4.6
Poey T-66	17	6.7

2. Spacing in Corn

AC 72 - 4. An experiment on seven corn varieties (two hybrids and five synthetics) at three plant spacings was initiated on March 11, 1972 and terminated on July 17, 1972. Records were kept on number of ears per plot, ear weight and grain weight.

There was tendency for fertile plants, rated as ears over stand count in percent, to increase with increased plant spacing. Percent fertility (average for seven varieties replicated twice) were 29, 37 and 50 for 6; 9 - and 12-inch plant spacing, respectively. In general, larger ears with higher percent as grain were obtained with 12-inch plant spacing.

Average ear weight (oz) for 6-inch, 9-inch and 12-inch spacing were 1.4, 2.0 and 2.6 respectively, and grain as percent of ear were 71, 73 and 74 respectively. However, estimated yield per acre for each plant spacing is as follows:-

- 6 inch - 552 lbs.
- 9 inch - 675 lbs.
- 12 inch - 902 lbs.

Low yields are a result of dry weather conditions (low fertility).

3. Weed Control in Corn

AC 72-18. Recommended herbicide for corn in Belize is Atrazine. However, spectrum of weed control is low so combination with another promising herbicide may provide better weed control.

Varying levels of Atrazine (pounds per acre) and Sutan (pints per acre) were applied at planting and soil incorporated. Best results were obtained with two pounds Atrazine plus one pint of Sutan (166% of control) expressed as ear weight. Four pounds Atrazine per acre was 11% of control.

4. Fertilizer

a. Levels of a Complex Fertilizer on Corn

AC 72-1. This experiment was initiated on January 5, 1972 and was terminated on April 10, 1972. Growth of corn hybrid DeKalb XL 44 was the concentrated mainly in the dry season. Levels of the complex fertilizer 12-24-12 used at planting were 0, 25, 50, 100, 150, 200, 300 or 400 lbs. per acre in a completely randomized block design with three replications.

Yield increase over control (0 lbs fertilizer) with added fertilizer ranged from 227 lbs per acre with 25 lbs of 12-24-12 to 911 lbs per acre with 300 lbs per acre (Table 14).

AC-72-12. Corn hybrid Poey T-66 planted on June 16, 1972 was fertilized with 0, 25, 50, 100, 150, 200, 300 or 400 lbs of 10-30-10. Design was similar to that of AC 72-1. Fertilizer level did not influence the time of 50% tasseling (68 days after seeding) or 50% silking (73 days after seeding).

Corn harvested on October 10, 1972 (116 days after seeding) indicated no significant yield over control up to 150 lbs per acre 10-30-10. However, yield with 200 lbs per acre was double that with 150 lbs per acre, and no additional increase was obtained with 300 or 400 lbs per acre.

Apparently more fertilizer is needed in the dry season than in the wet season to attain maximum yields. It is expected that yields obtained from dry season planting will be lower than wet season planting.

Table 14. Yield (lbs per acre) of corn hybrid grown at Roadside, Central Farm as influenced by level of a complex fertilizer

Rep.	0	25	50	100	150	200	300	400
1 a	1007	1193	1123	1877	1568	1999	1706	1547
b	1540	1257	950	1594	1221	4721	1952	3081
2 a	944	902	876	1380	1206	1090	1434	2060
b	584	1062	796	2125	1487	1531	2284	2601
3 a	574	1112	1776	1290	1425	1137	2118	1541
b	1328	1802	1802	1221	1227	1965	2762	1865
1 Avg a	842	1069	1258	1516	1399	1409	1753	1752
b	1151	1380	1183	1647	1327	2739	2333	2547

Corn hybrid used was (a) DeKalb XL 44 (b) Poey T-66
 Fertilizer used was (a) 12-24-12 (b) 10-30-10
 Corn growth January (a) to April 1972 (b) June to October 1972.

b. Fertilizer Type x Level on Corn

AC 72-11. The objective of this experiment was to obtain optimum fertilizer levels of application for corn. Levels of N, P, K, in a complete factorial design applied to 25 ft x 25 ft plots were as follows:-

N (Urea) : 0, 50, 100, 150 lbs N per acre

P (TSP) : 0, 50, 100 - lbs P_2O_5 per acre

K (KCL) : 0, -, 100, 150 lbs K_2O per acre.

Corn hybrid Poey T-66 was planted on June 8, 1972 at Roadside, Central Farm. Planting rate was 10 inches between plants, 30 inches between rows. Herbicide application was four pounds commercial Atrazine per acre one week after planting.

Fertilizer combination had no effect on tasselling and silking.

Samples taken at harvest on October 9, 1972 (123 days crop) were from two centre rows 10 ft each. Both N and P are equally important in increasing yield in corn (Table 15). However, no additional increase was obtained by levels higher than 50 lbs per acre of either N or P indicating that factors other than soil fertility may be limiting yield (water or weeds). Highest yield (4,420 pounds of corn) was obtained with N,P,K, levels of 100, 50, 100 pounds respectively (Table 16). Fifty pounds of P alone produced 2,934 pounds of corn, sixfold that of the control. Present recommendations call for 200 lbs of 10-30-10 plus 100 lbs of urea providing 66-60-20 lbs per acre of $N P_2O_5 - K_2O$; so it appears that additional fertilizer will increase yield in corn by at least 1,000 lbs (50-50-100 produced 2,506 lbs. Table 16).

Table 15. Average yield (lbs) per acre of corn hybrid Poey T-66 grown at Roadside, Central Farm with varying levels of N,P,K but considering only main effects (June to Oct. 1972).

	0	50	100	150 lbs/Ac
N..	1488	2288	2440	2191
.P.	1579	2679	2125	
..K	2015		2296	2072

Table 16. Average Yield (lbs) per acre of corn hybrid Poey T-66 grown at Roadside, Central Farm as a function of N,P,K (June to Oct. 1972)

N	P			K			K			K		
	0	100	150	0	100	150	0	100	150	0	100	150
0	452	1776	1066	1010	1877	2283	1753	2921	1363	2148	1257	1040
50	2943	1676	2868	3260	2506	2797	1791	4420	2368	2585	1934	2934
100	1061	1416	1134	2549	2249	1990	1876	2266	3187	2752	3257	1757

Summary

During 1972, Poey T-66 proved to be the best hybrid while Sintux (white corn) proved to be the best synthetic. Optimum plant spacing for six varieties for 30 inch row was 12 inches. Two pounds of Atrazine plus one pint of Sutan gave better control of weeds in corn than a treatment of 4 lb. Atrazine per acre. Finally, level of fertilizer for corn can be increased to provide 100 lbs of N, 50 lbs of P and 100 lbs of K. In most soils K is non-limiting, so a suitable fertilizer may be 18-46-0.

SOYBEAN1. Variety Testing

OC 71-4. Soybean variety testing (Dec. 3, 1971 to March, 1972) at Yo Creek sub-station indicated that best variety was Improved Pelican with estimated yield of 1,338 lbs. per acre, followed by Acadian with 1,218 lbs. per acre, then by F-62/3977 with 1,189 lbs. per acre. Dan and Curtin were lowest yielders. F-62/3977 was later than Acadian or Improved Pelican so care must be taken to harvest F-62/3977 only at seed maturity.

OC 72-2. Six new varieties of soybean were obtained from Columbia (Instituto Colombiano Agropecuario) South America. These varieties were seeded on January 10, 1972 in an effort to multiply the seed. Some characteristics of these varieties appear on Table 17.

Table 17. Characteristics of six ICA soybean varieties grown at Central Farm. (January to April, 1972)

<u>Variety</u>	<u>Short (s) or Tall (T)</u>	<u>Time to Harvest (Days after seeding)</u>	<u>Seed Wt. (gm. per plant)</u>
ICA Taroa	S	86	8
ICA Lili	S	107	8
Mandarin S4-ICA	T	105	12
Pelican SM	T	94	10
203-1-5	S	101	8
203-17-3	S	94	8

18 Mandarin S4 and Pelican SM yielded best.

OC 72-8. On June 30, 1972 twelve varieties of soybean were placed in the nursery at Central Farm. These included varieties previously tested locally plus the six ICA varieties. Best varieties were Improved Pelican, Pelican SM, Acadian, F 72/3977 and Mandarin SM. (Table 18). In most cases, high yielding varieties also had high amount of pods per plant. In addition, seeds per pod and seed weight were uniform among varieties.

Ten varieties were selected as potential high yielders for future testing. These were planted in November, 1972.

Table 18. Pod number per plant (a), average height of first pods above ground (b) and average height at maturity, (c) for 3 rows 50 ft. each for each of twelve soybean varieties grown at Central Farm (June 30th October 1972).

<u>Variety</u>	<u>a.</u>	<u>b.</u>	<u>c.</u>
Acadian	59	5"	40"
Curtin	25	2"	16"
Dan	50	4"	27"
F 62/3977	53	7"	37"
F 72/3977	51	4"	32"
ICA Taroa	31	3"	22"
Imp. Pelican	61	6"	38"
Mandarin	21	5"	25"
Pelican SM	34	1"	33"
203-1-5	18	4"	17"
203-17-13	27	4"	30"
ICA Lili	21	4"	24"

Semi-Commercial testing. In July 1972 one acre each of Improved Pelican and Acadian was seeded to obtain basic information on acre-yield, combine harvesting, lodging, pest problems, etc. This crop proved to have a stand of approximately 70%, lodging was minimal, insects and weeds were the worst problems, combine harvest losses was approximately 10%. Approximate yield for Acadian was 1,750 lbs. per acre and for Improved Pelican was 1,600 lbs. per acre. Seed was used for November planting and for animal feed. Oil content for these two varieties is 18 percent and protein content is 40 percent of seed weight.

Commercial testing. A total of 20 acres of Improved Pelican and Acadian were planted in November. So far weed control is still very poor.

2. Timing and Level of Fertilizer

OC 71-1 & OC 71-2. This experiment was initiated on December 8th, 1971 at Central Farm (OC 71-1) and on December 16, 1971 at Melinda, Stann Creek (OC 71-2). Soybean varieties used were: Acadian and Improved Pelican. Fertilizer (10-40-10) at three rates: 0 lbs., 96 lbs. and 120 lbs. per acre was applied either at planting in split applications (at planting and at flowering), or at flowering. All treatments were replicated three times in a split plot design with variety as main plot, timing as sub-plot and fertilizer level as sub-sub plot.

Both crops (Central Farm and Stann Creek) were harvested 111 days after seeding. Yields for Acadian at Central Farm ranged from 957 lbs. to 1,593 lbs. per acre. Best yields for Acadian were obtained with 96 lbs. per acre 10-40-10 fertilizer and maximum yield was obtained when fertilizer was applied at planting. Best yields were similarly obtained for Improved Pelican with 96 lbs. per acre 10-40-10 but highest yield was obtained with fertilizer applied at flowering. The potential for increasing yield through correct fertilizer rate and timing was higher for Improved Pelican than for Acadian. More than two-fold increase in yield (from 583 to 1,738 lbs. per acre) was achieved by fertilizing Improved Pelican with 120 lbs. per acre of 10-40-10 fertilizer at planting. There was no substantial gain by increasing fertilizer rate from 96 lbs. to 120 lbs. per acre for Acadian.

Comparing soybean yield at Yo Creek (OC 71-4), Central Farm and Stann Creek, Acadian and Improved Pelican varieties yielded approximately the same at Yo Creek and Central Farm, but approximately half as much at Stann Creek. P.K. fertility at Central Farm (1.7 ppm.P, 84 ppm.K) approached that at Yo Creek (1.8 ppm.P, 77 ppm.K) and not that at Melinda (12 ppm.P, 115 ppm.K). The difficulty with attributing differences in yield to P-K fertility stems from higher nutrient status of P-K at Stann Creek in contrast to lower yields. N fertility may not be important due to N-fixation by soybean. It is possible that differences in yield may lie in pH differences. The Ca status of Yo Creek soil was 4,240 ppm of Central Farm soil was 3,840 ppm and of Melinda soil was 466 ppm indicating low pH for Melinda. Yield responses of soybean to fertilizer should interact with responses to soil pH status.

3. Seed Multiplication. A seed supply for approximately 25 Ac with Acadian and Improved Pelican varieties has been maintained at Central Farm. A larger quantity of seed can be collected if need be.

4. Summary. Varieties of soybean are continuously being tested to obtain suitable varieties for commercial plantings. Two varieties, Acadian and Improved Pelican have yielded satisfactorily to be grown commercially. Fertilizer rates have to take into account both soil fertility and pH soil status.

RICE

1. Variety Testing

AC 72-15. Four rice varieties Blue Belle, Blue Bonnet, CICA4 and IR22 were tested at Central Farm. Rice was seeded by hand on June 20, 1972 and cultural practices were as for commercial planting - one gallon Propanil per acre one week after planting, fertilizer 10-30-10 at the rate of 200 lbs. per acre, seeding approximately 100 lbs. per acre.

Hoe weeding was practiced once.

Blue Belle and Blue Bonnet are tall varieties while CICA4 and IR 22 are dwarf varieties. The former two varieties matured after 112 days while CICA4 matured after 133 days and IR22 matured after 146 days. Estimated yields per acre for Blue Belle was 3,240 lbs, for CICA4 was 3,400 lbs, for IR22 was 1,740 lbs. and for Blue Bonnet was 4,000 lbs.

Mafredi Commercial. Average yields as brown rice for Blue Bonnet in three locations were 4,595 lbs., 4,892 lbs. and 6,664 lbs. and for Blue Belle were 1,190 lbs, 1,938 lbs. and 3,672 lbs. Only disadvantage with Blue Bonnet was excess lodging which increases as crop becomes mature. Any delay in harvest once the grain is dry will result in lower yield of Blue Bonnet per acre.

2. Weed Control

a. Timing and Concentration of Herbicide

AC 72-7. Propanil, a post-emergence herbicide commercially used in rice in Belize, was applied on Blue Bonnet rice at Mafredi at planting, two weeks after planting or four weeks after planting, at concentrations of 1, 2 or 3 gallons per acre. Experimental design was a split-plot with timing as main plot and concentration as sub-plot in 3 replicates with plots of 1/3 acre.

At harvest (Sept. 22, 1972) yield of each plot was estimated from the average of 3 samples, each 10 ft. by 10 ft. yield of cleaned brown rice in pounds per acre was estimated.

The best yield (2471 lbs. per acre) was obtained with two gallons of Propanil applied two weeks after planting. At seeding or one week after seedling weed control was not effective even with varying concentrations. So timing may be more important than concentration for weed control in rice.

b. Pre-versus Post-Emergence Herbicide

A pre-emergence herbicide - Preforan was compared to the post-emergence herbicide Propanil on rice at Central Farm and Mafredi.

Both at Central Farm and Mafredi, Propanil was more effective than Preforan in controlling weeds. Preforan controlled weeds only temporarily, its effect lasting to a maximum of four weeks.

3. Fertilizer

Fertilizer Type x Level on Rice

AC 72-9. Rice variety Blue Bonnet was seeded at the rate of 60 pounds per acre at Rancho Dolores on May 19th, 1972. On the same day, levels of N,P and K were applied to plots 25ft by 25ft in a factorial design utilizing 0, 50, 100, 150 lbs. N per acre (as ammonium sulphate); 0, 50, 100 P per acre (as triple superphosphate) and 0, 100, 150 lbs. per acre of K (as muriate of potash). Each treatment was replicated three times.

Rice was harvested on October 4, 1972 (108 days-crop), and yield estimated per acre. Fertilizer combination of 0, 100, 0 (N,P,K) gave the highest yield (1,694 pounds) followed by 50, 50, 0 (1,613 pounds) (See Table 19). It was apparent that potassium had little or no effect on rice yield. Examination of main factors indicated that the most important fertilizer factor was phosphorous. Main effects indicated no increase in yield with N or K rates from 0 to 150 lbs. per acre but substantial increase in yield with rates from 0 to 50 lbs. of P per acre. The P status of the soil was 20ppm (40 lbs. per acre).

4. Summary

Blue Bonnet (tall) and CICA 4 (dwarf) are two varieties which gave highest yields in a variety trial at Central Farm. Variety testing will be shifted to Mafredi, Toledo. Propanil is very effective for weed control in rice and

timing is more important than concentration. Lastly, at Rancho Dolores some response to P, and no response to K was obtained in rice. A suitable fertilizer is 18-46-0, as for corn at Central Farm.

Table 19. Estimated yield (lbs) per acre of Blue Bonnet rice at Rancho Dolores, Belize from an average of 3 replicates in a factorial design with N,P,K, fertilizers (May to October, 1972)

lb/acre of N	0			50			100			150		
	K			K			K			K		
	0	100	150	0	100	150	0	100	150	0	100	150
0	800	594	620	443	1100	589	1042	590	586	737	1393	810
50	810	1397	1470	1613	1250	1397	1320	1320	1177	1007	813	961
100	1694	1323	1247	1320	810	1320	1177	1250	814	1173	1177	1320

D. OTHER CROPS

1. Dry Bean

A. AC 72-20. Variety Testing. Fifteen varieties of dry bean were seeded on November 16, 1972; at Roadside, Central Farm, one row 50 ft long per variety. Promising varieties were Quarter White, Coulee Red, African 17, Charlevoix, California Red, Round Red and Royal Red.

B. Fertilizer - Herbicide on R.K. Bean. Combination levels of Herbicide - Linuron and Fertilizer - 12-24-12 were placed on R.K.Bean at Central Farm. Levels of Linuron were: 0, 1, 2, 3, 4 and 5 lbs. of commercial product per acre and levels of 12-24-12 were: 0, 50, 100, 150 and 200 lbs. per acre. Both Linuron and fertilizer were applied at planting on December 29, 1971.

Because of excess rain during flowering and pod development, even the highest yield (572 lbs. per acre) was low. With no fertilizer added, four pounds of Linuron was most effective in determining highest yield. With no herbicide, highest yield was obtained with 100 lbs. of 12-24-12 per acre. It was clear that to increase yield in bean, proper combination of herbicide and fertilizer is needed.

2. Peanut

OC 72-10

Variety Testing

Seven varieties of peanut were planted on September 20, 1972. These were Argentine, NC2, Roxo, Spanish Lookout, Valencia, NC5 and 72R. Agronomic features looked for were: a) resistance to disease, b) yield and c) uniformity in seed number per pod. Higher yielding varieties were: Roxo, NC5, 72R and Valencia; varieties NC2, NC5 and 72R were uniform in seed number per pod. Emphasis will be placed on seed multiplication and seed selection.

3. Safflower

Variety Testing.

Two ounces each of eight varieties of safflower were received from United States Department of Agriculture for testing at Central Farm. Half of the seed was planted on January 7, 1972 and the rest was planted on January 14, 1972 in rows each 50 ft long.

Safflower grew and developed well during the dry season. The second planting did better than the first because soil moisture was optimum for seedling emergence. Safflower was harvested 115 days after seeding for the first planting and 129 days after seeding for the second planting. Better varieties were UC-1, Royal, US-10, and Rio. A second test will be performed in 1973.

E. Soils. Soil testing at Central Farm has been concentrated to experimental locations for the Crop Agronomist, the Pasture Agronomist and to farmers with specific problems in soil fertility. The Soil Laboratory has analyzed forage samples for N, P, K. Soil fertility status for some soils appear in Table 20.

Table 20. Estimated values (lb. per acre) and pH of specific soils in Belize (August, 1972).

Location	N	P	K	Ca.	pH
Society Hall	834	23	448	2076	7.3
Rancho Dolores	570	20	282	398	7.1
Willows Bank	44	10	48	152	6.8
Calla Creek	1466	32	820	1464	7.7
Central Farm	451	21	268	375	7.2

Elements most limiting are N and P, and except for Calla Creek pH is suited to corn, bean, soybean and rice.

Livestock Research

Cattle. The overall performance of the various herds was lower than 1971 due primarily to overgrazing. The delay in the establishment of the new livestock station at Richmond Hill in the Orange Walk district and the expansion of the "Costa Rican" herds imported in 1971 were the prime causes of overstocking at Central Farm. Of the pure breeds the highest average weaning weights were achieved by the Red Poll herd. Of the cross-bred calves the highest average weaning weights were achieved by the "Costa Rican" Brahman X Charolais calves.

The Charolais has so far proven to be the most promising of the imported bulls in fertility and the average birth and weaning weights of the calves sired.

The Hereford herd is the least promising, the animals have shown no sign of adapting to our climatic conditions. The pure bred calves have a high mortality rate.

There is an increasing demand for Grade Brahman breeding stock from farmers throughout the country. Of the pure breeds the Red Poll is preferred.

The Livestock Register of the Department showed a total cattle population of 1,432, of which 1,028 were Grade Brahman (mostly Costa Rican herds).

The Brown Swiss Dairy herd at Central Farm has continued to give very satisfactory performance throughout the year. The average milk production during the year was 18.5 lbs per cow per day.

Pigs

The outbreak of Virus Pneumonia diagnosed in late 1971 was confirmed in 1972. This caused a very low performance of all breeds and a very high mortality rate. It is suspected that this disease was brought in with the last importation of breeding stock from the U.S.A. The herds were quarantined for most of the year and if the outbreak persists may have to be completely dispersed.

Pasture Research

The pasture reports presented take into consideration previous results. The report of the Pangola fertiliser trial in the Pine Ridge has been sent to the University of the West Indies for computer analysis. This past year has seen the division engaging in its first grass species evaluation using the grazing animal as indicator. It is anticipated that two more trials will be initiated at Central Farm during 1973.

Pasture Introduction Block

Reports on the analysis of the grasses planted in the Pasture Introduction Block were made in the Annual Reports of 1969 and 1971. The first report considered only fresh weight yields and protein content of the grasses. This report presents dry weight yields and crude protein yield as related to dry weights. Results of the performance of the introduced legumes are included.

The results of grasses G-1 to G-45 are to be found in Appendix VI, these being the first introductions. The first recorded cut was made in April, 1967 and has been followed by thirteen other cuts to date.

On the assumption that an adult animal would consume 30 lb. dry matter per day, an estimate was made of the equivalent stocking rate of various grasses on the basis of yields realized from these small plots. This involves extrapolation and, as such, can only be used as an indicator for further grazing trials.

Table 21. Average Stocking Rate of Different Grass Varieties
(Animal Units per Acre)

Molopo Buffel	- 1.9	Guinea	- 1.5	Jaragua	- 2.4
Nunbank Buffel	- 2.3	Pangola	- 1.4	Rodds Bay	- 1.0
Big Bluestem	- 1.4	Coloniao Guinea	- 1.7	Carib	- 2.0
Gayndah Buffel	- 1.2	African Guinea	- 1.5	Rhodes Grass	- 0.5
Hyparrhenia hirta	- 1.7	Nandi Setaria	- 0.6	Argentine Bahia	- 1.0
Elephant Grass	- 1.7	Columbus Grass	- 1.4	Star Grass	- 1.3
Biloela Buffel	- 1.6	Molasses Grass	- 0.8	Buffel	- 2.0
Sweet Grass	- 0.9	Merker Grass	- 3.2	Pensacola Bahia	- 0.7
Hamil Grass	- 2.0	Japanese Grass	- 0.8	Coastal Bermuda	- 1.3
Bambatsi Grass	- 0.8	Bluestem	- 1.7	Aleman Grass	- 0.9
Kazungulu Setaria	- 0.9				

These results were obtained under a modest fertilizer regime. Total crude protein yields are given in Appendix VII. The last recorded cut for these grasses was on January 28th, 1969. Other grasses continued to be cut and their results appear in Appendix VIII and IX. Projections of the equivalent stocking rate for these grasses are given in Table 22 below.

Fewer grasses are now being cut in the introduction blocks as the emphasis in research is now in the statistical testing of grasses in replicated trials and grazing trials. Information on grasses to date indicates very good performance from the different varieties of Guinea grass (*Panicum maximum*), Buffel grass (*Cenchrus ciliaris*) and Elephant Grass (*Pennisetum purpureum*). There is definitely a place for these grasses in the livestock industry. Carib grass (*Eriochloa procera*), Pangola grass (*Digitaria decumbens*), and Jaragua grass (*Hyparrhenia rufa*) are also good grasses for differing soil and management conditions in the country.

Table 22. Average Stocking Rate of Different Grass Varieties (Animal Unit Per Acre)

Scrobie Grass	- 0.5	Signal Grass	- 1.6	Rhodes Grass	- 0.6
Paspalum plicatulum	- 1.5	Embu	- 0.4	Buffel	- 1.0
Tarrewinnabar Buffel	- 2.0	Lovington Grass	- 0.8	Pato Rico	- 0.4
Green Panic	- 0.9	Kennedy Ruzi	- 1.4	Scrobie Grass	- 0.5
Kazungulu Setaria	- 1.5	Piano Grass	- 1.0	Cotton Panic	- 0.8
Biloela Buffel	- 1.6	Creeping Guinea	- 0.6	Buffel	- 0.5
Napier Enano	- 1.7	Buffel	- 0.9	Aleman Grass	- 0.6
Kikuyu	- 0.3	Buffel	- 0.5	U.S. Buffel	- 0.4

The very encouraging results of Buffel grass varieties in the Introduction Block may prove misleading if the grass is not palatable. The few observations made at Central Farm indicate that cattle do not readily accept the grass.

Legumes

Very few results have so far been forthcoming on the relative worth of the various legumes which have been introduced to this country. The importance of legumes as a natural rich source of protein for the grazing animal must, of course, be judged on the basis of crude protein yield per acre. The results of analysis of a number of introduced tropical legumes are provided in Appendices X and XI.

In terms of yield Tropical Kudzu (*Pueraria phaseoloides*), Centro (*Centrosema pubescens*), Vigna marina, *Clitoria ternatea* and Siratro (*Phaseolus atropurpureus*) gave the best sustained performance. Observations also indicate *Centrosema pubescens* to be the most persistent and consistent legume of those tested. *Stylosanthes cyanensis* from which no analytical results have yet been obtained has indications of being a good legume for pastures. It is free of damage from disease and insects except after flowering when it is liable to be attacked by the Anthracnose fungus.

Pangola Fertiliser Trial - Pine Ridge

This trial was discussed at some length in the Annual Report of 1971. The results so far available are limited to fresh weight yields of the various treatments listed below:-

Nitrogen: 700 lb., Urea; 1400 lb Urea; 2800 lb Urea per acre per annum in 7 applications;
Phosphate: Nil; 100 lb TSP; 200 lb TSP per acre per annum in two applications;
Potash: Nil; 100 lb KCL; 200 lb KCL per acre per annum in two applications.

Plots receiving complete fertilizer treatments continue to yield much better than those receiving only one or two elements. Average plot yields: N only 31.5 lb; N plus P or K 49.9 lbs; N plus P plus K 101.5 lbs. The response to phosphate is greater than that to potash. The response to higher levels of Nitrogen is limited. The following table presents the results for each treatment (an average for four replications).

Table 23. Pangola Fertilizer Trial - Pine Ridge
Average Fresh weight yield (4 replicates)
lb/plot

Treatments		P0			P1			P2			Average	
K0	NI	32.0			59.6			65.8			NIK0	52.5
	N2	29.6			58.4			70.4			N2K0	52.8
	N3		33.0			69.0			77.3		N3K0	59.8
K1	N1	26.4			83.8			91.8			NIK1	67.3
	N2		36.1		82.6			107.8			N2K1	75.5
	N3			31.5		88.8			112.4		N3K1	77.6
	NI	35.6			80.1			108.5			NIK2	74.7
K2	N2		26.8		104.9			121.3			N2K2	84.3
	N3			41.4		101.4			134.6		N3K2	92.5
Average		N1P0	N2P0	N3P0	NIPI	N2PI	N3PI	N1P2	N2P2	N3P2	NPK	
		31.3	30.8	35.3	74.5	82.0	86.4	88.7	99.8	108.1	70.8	

Overall Averages: N I ; 64.8 ; N2 ; 70.9 ; N3 ; 76.6 ;

P0 ; 32.5 ; P1 ; 81.0 ; P2 ; 98.9 ;

K0 ; 55.0 ; K1 ; 73.5 ; K2 ; 83.8 ;

On the assumption that an animal would consume 60 lb fresh grass per day an estimate was made of the stocking rate equivalent under the following treatments in the Mountain Pine Ridge. The results show that NI PI would carry 0.6 animals per acre; N3PI would carry 0.8 animals per acre; and N3P2K2 would carry 1.6 animal per acre.

Grass Species Trial

As stated in the 1971 Annual Report the objective of this trial is to determine the performance of different grass species (and varieties) under similar treatment conditions at three sites, namely:- Central Farm on alluvial clay loam; Hattievillle Centre on Coastal deposit; and Yo Creek Agstat on lime-enriched sandy clay.

The results of ten cuts at the Central Farm replicate show the best performance in terms of fresh weight yield to be Hamil Grass, Nunbunk Buffel and Guinea Grass in descending order. There was no major pest or disease damage during the year except for the Rust fungus on Pangola grass and Brown Leaf Spot on Hamil grass. Maintenance was limited to weeding of the plots and walkways. (See Table 24).

The replication at the Hattievillle Centre progressed satisfactorily during most of the year. The results of fresh weight yield so far indicate very good results from Kazungulu Setaria, Hamil grass, Pangola grass and Guinea grass (See Table 25).

These results support the overall appearance of the individual grasses in respect of regrowth and lush appearance after each cutting. No practical information has been forthcoming from the replication at Yo Creek Agstat.

Table 24. Grass Species (Variety) Trial - Central Farm
Fresh Weight Yield - 10 cuts (lbs/plot)

Grasses	Block 1	Block 11	Block 111	Block 1V	Total	Average
Jaragua	317.5	326.0	330.5	280.0	1254.0	313.5
Guinea	355.5	337.0	327.5	314.5	1334.5	333.3
Gayndah Buffel	259.0	241.5	259.0	200.5	960.0	240.0
Pasto Rico	122.0	131.0	144.5	107.0	504.5	126.1
Kazungulu	287.5	200.0	197.0	199.5	884.0	221.0

Hamil	370.0	372.0	399.5	453.0	1594.5	398.6
Pangola	200.5	252.5	214.0	244.0	911.0	227.7
Molopo Buffel	279.0	293.0	242.5	308.0	1122.5	280.6
Biloela Buffel	329.5	320.5	269.0	279.0	1198.0	299.5
Carib	319.5	278.0	286.0	287.5	1171.0	297.7
Nunbank Buffel	395.0	307.5	311.0	279.5	1393.0	348.2

Table 25. Grass Species (Variety) Trial - Hattievville
Fresh Weight Yield 5 cuts (lbs/plot)

Grasses	Block 1	Block 11	Block 111	Total	Average
Jaragua	22.5	27.0	31.5	81.0	27.0
Guinea	51.0	47.0	67.0	165.0	55.0
Gayndah Buffel	14.0	10.5	5.0	29.5	10.0
Pasto Rico	20.0	21.0	10.5	51.5	17.2
Kazungulu	76.0	61.5	67.0	204.5	68.2
Hamil	49.5	50.0	96.0	195.5	65.1
Pangola	51.0	55.5	60.5	167.0	55.7
Molopo Buffel	23.5	28.0	17.0	68.5	22.8
Biloela Buffel	25.5	21.0	18.0	64.5	21.5
Carib	39.0	46.0	49.5	134.5	44.8
Nunbank Buffel	23.5	18.5	23.5	65.5	21.8

Pangola Rotational Grazing Trial

A grazing trial commenced in July on alluvial clay loam at Central Farm to test the performance of Pangola grass under two grazing systems. Five paddocks are rotated through a 40 day cycle (8 days grazing in each) whilst nine paddocks are rotated through a 27 day cycle (3 days grazing in each). A low fertiliser programme of 75 lbs Urea per annum is being carried out. A record is kept of daily live weight gain and total beef yield per acre of pasture. Eight steers were used as indicators under each treatment. Surplus forage was noted in both treatments, indicating that a higher stocking rate could have been used to advantage.

Over a period of 140 days the steers gained 288 lb. per acre and 233 lb. per acre on the shorter and longer rotations respectively.

Arable Ley Rotation Trial

This is the fifth report of the progress of this trial.

Crops

The corn crop was planted in June, 1972 in Blocks V and VI totalling 4.7 acres. Block V was destroyed by a combination of a severe attack of army worm and later cattle. Block VI yielded 4,500 lbs. No bean crop was planted.

Pasture

Ten steers were grazed on the 9.84 acres of pastures. (Block 1, 2.58 acres of Carib and Para grass; Block 11, 2.22 acres of Pangola; Block 111, 2.14 acres of Pangola; Block 1V, 2.90 acres of Nunbank Buffel. The steers were rotated on a 36 day grazing cycle (9 days in each paddock). On 22nd June two additional steers were introduced to the trial. Table 26 below shows the initial weight and last recorded weight of the steers along with average daily gains. The grazing year operates from 26th April each year.

Table 26. Weight of Steers and Average Daily Gains of Steers on Arable Ley Rotation Trial - 1972 (lbs)

<u>Steer Brand</u>	<u>Weight on 26/4/72</u>	<u>Weight on 22/6/72</u>	<u>Weight on 26/4/73</u>	<u>Average Daily Gain</u>
1-54	400	-	743	0.95
1-87	400	-	732	1.07
1-44	409	-	810	1.99
1-158	411	-	761	0.96
1-150	415	-	808	1.05
1-86	417	-	735	0.86
1-104	418	-	837	1.14
1-143	431	-	815	1.06
1-16	435	-	918	1.32
1-135	444	-	772	0.89
1-46	-	433	732	0.97
1-189	-	466	772	0.99

A complete financial report will be included when the steers have been sold. During the year it was decided to yard the steers overnight before weighing to reduce variations in the calculation of daily weight gain.

Grazing Record

The grazing record for Central Farm has been compiled. There is considerable variation between pastures as shown below. The majority of pastures at Central Farm are now in native grasses. Grazing days per acre is used as the indicator.

Pasture	Acres	Grazing days/ac	Pasture	Acres	Grazing days/ac	Pasture	Acres	Grazing days/ac
A - 1	29.5	272	B - 12	55.4	260	C - 4	65.9	284
D - 1	10.8	567	D - 2	9.4	385	E - 11	49.0	316
F - 8	66.3	257	F - 9	73.4	443	F - 10	131.0	325
F - 11	54.0	330	G - 4"	6.8"	436"	1 - 4/5	16.8	594
I - 7	17.4	368	I - 8	12.8	427	J - 1	22.8	258
J - 2	21.9	312	J - 3	26.6	154	J - 4/5	93.1	132

" applies to nine months grazing only.

C. EXTENSION SERVICES

Crop Extension

Extension activities involving the distribution of seeds, demonstrations of improved cultural practices, processing and supervision of loans, and advice to farmers on request were carried out by the Extension Division during the year.

The Extension Division carried out the annual crop survey of the 1972 rice, corn and bean crops.

Farm visits, group discussion meetings, and group lectures on specific topics made up the majority of the division's activities throughout the year.

Livestock Extension

Extension activities involving farm visits, demonstrations of proper management practices, group discussion meetings and lectures were carried out by the Livestock Division during 1972.

Orange Walk district staff pioneered a system of regular scheduled visits to villages in the district. This system undoubtedly has a greater impact and is more economical on resources than casual visits. It is hoped to extend the principle to other districts as circumstances permit.

Work was begun on a full revision of the Register of Cattle Brands, it is hoped to complete this lengthy undertaking during 1973.

Mechanical Services

The Mechanical Division continued to provide custom machinery services to farmers in addition to performing all such services for the Department of Agriculture itself. Some 1,300 acres of land were cleared and some-ploughed for farmers and a further 165 acres for the Department itself during 1972. The majority of this work was carried out in the drier period of the year between January and June.

Other mechanical services carried out included land preparation, cultivation and harvesting of 790 acres of rice for farmers, cultivation and planting of 160 acres of maize of which 75 acres were combine harvested for three cooperatives in the Corozal district.

The department's machinery was unable to cope with the farmers demands for custom services. As an example of the long hours worked during peak periods one operator worked 290 tractor meter hours in May, equivalent to some 14 hours per day throughout the month.

A total of 15 wells were successfully completed during the year, in addition twelve others were abandoned due to caving in, salt water, hard or non-water-bearing nature, etc. The deepest successful well dug reached 198 feet at Camalote Village.

A number of ponds were dug for farmers, mostly in the Cayo district.

The Mechanical Division carried out all repairs and maintenance on the fleet of some 45 vehicles operated by the Ministry of Agriculture, Lands, Cooperatives and Surveys. In addition the Department operated 5 crawler tractors, 4 combine harvesters and 20 rubber wheeled tractors.

National Agricultural Show

The third National Agricultural Show was held on 10th, 11th and 12th November at the Showgrounds at Belmopan. The Show climaxed a week of activities throughout the country. The Show was opened by the Premier, the Honourable George Price, and the main address was delivered by the Minister of Agriculture, the Honourable Fred Hunter.

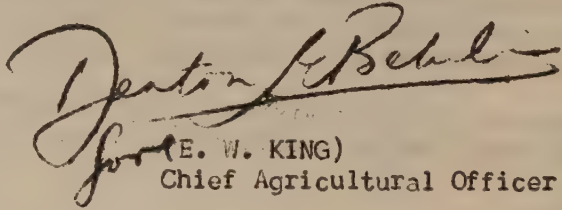
The Show attracted a record attendance and a considerable number of entries in both the crop and livestock sections.

The Livestock Division of the Department gained the following awards:

<u>Cattle</u>		<u>Pigs</u>	
Grand Champion Bull		Champion Senior Boar	
Red Poll Bull	1st Prize	Champion Junior Boar	
Charolais Bull	" "	Champion Sow	
Indo-Brazil Bull	" "	Champion Gilt	
Brown Swiss Bull	" "	<u>Sheep</u> Champion Ham	
Brown Swiss Bull	2nd Prize	Champion Ewe	
Brahman Junior Bull	" "	Ram 1st Prize	
Jamaica Black Cow	1st Prize	Ewe " "	
Indo-Brazil Heifer	" "		

Acknowledgements

Continued help and cooperation has been received from official bodies, other Government bodies, private firms and private individuals. This help is greatly appreciated, without it much less would have been achieved.



(E. W. KING)
Chief Agricultural Officer

Appendix 1

RAINFALL FOR 1972

MONTH	Station	Landi var	Int. Airport	Amber- gris Caye	Big Falls	S. Cr. Agstat	Savannah Forest	Cabbage Haul	August- line	Coora	Central Farm	Yo Ck.	Melinda Forest	San Roman	Toledo Agstat
JANUARY		8.94	9.36	6.83	7.87	8.19	6.70	8.33	4.80	11.44	7.81	4.10	8.36	3.40	8.86
FEBRUARY		2.59	1.74	4.42	3.67	4.09	3.22	2.73	4.02	4.41	3.49	1.66	4.95	1.26	7.30
MARCH		5.51	2.14	0.06	0.63	3.82	2.79	2.03	0.71	0.97	0.71	1.06	3.99	0.08	3.20
APRIL		2.22	4.90	NIL	2.61	1.41	0.91	1.95	0.40	1.80	1.25	0.06	3.45	NIL	3.50
MAY		1.02	5.38	1.53	NIL	1.43	0.32	1.47	0.41	1.79	0.74	4.21	1.32	3.33	4.80
JUNE		6.41	7.00	3.78	8.32	13.90	14.57	15.30	3.14	7.68	4.18	4.35	13.84	7.30	16.82
JULY		7.36	12.94	4.39	N.A.	16.16	16.97	19.57	9.47	13.27	25.20	16.21	15.15	9.66	33.55
AUGUST		7.41	10.00	2.90	N.A.	10.07	13.17	10.30	6.28	6.08	8.74	7.64	9.56	8.18	30.21
SEPTEMBER		7.87	6.86	5.32	9.58	6.28	11.12	11.46	10.30	4.01	21.35	5.78	6.22	5.87	13.49
OCTOBER		8.31	8.96	7.64	10.02	9.53	11.49	10.53	6.46	11.03	6.56	8.63	10.16	2.78	10.83
NOVEMBER		1.97	1.34	0.68	2.53	10.64	7.71	9.85	2.83	2.34	1.30	1.64	9.89	2.17	15.46
DECEMBER		10.90	7.80	7.14	6.91	8.72	14.71	10.26	10.71	13.62	14.49	5.24	10.06	4.74	11.60
TOTAL		70.51	78.42	44.69	N.A.	94.29	104.22	103.78	59.53	78.32	95.82	75.59	96.95	48.77	159.62

1972 - Ave. M. Temp./extreme

MONTH	YEAR	Land- var	Eze. Int. Airport	Amber- gris Caye	Big Falls	S. Ck. Agost	Sav. For	Cable Haw	August- ine	Cooma	Yo Creek	Melinda Forest	San Roman	Tol. Agost
JANUARY		83/85	83/85	84/85	84/94	83/83	85/91	85/92	82	72/78	84/89	85/90	85/87	76/83
FEBRUARY		85/85	83/90	83/86	86/101	84/83	82/91	84/92	80	72/80	85/94	83/95	86/88	75/82
MARCH		85/90	85/86	84/85	89/101	84/82	91/92	85/92	82	80/82	80/100	90/99	89/97	82/85
APRIL		87/91	84/89	88/89	90/92	85/85	95/98	86/93	96	82/88	91/94	90/93	90/92	83/87
MAY		90/92	85/90	88/88	N.A.	88/90	94/99	88/94	94	85/90	95/102	93/96	90/92	83/87
JUNE		88/91	83/93	84/90	93/98	81/92	93/99	80/94	90	82/88	89/94	91/98	88/89	84/88
JULY		87/90	86/89	86/89	N.A.	85/87	89/95	84/92	84	81/85	88/93	90/92	86/90	81/88
AUGUST		88/92	85/85	85/87	N.A.	85/87	91/95	85/97	84	78/84	80/91	91/96	88/89	80/86
SEPTEMBER		87/90	87/89	88/89	90/95	87/88	92/96	84/90	83	72/83	89/94	92/94	81/87	81/87
OCTOBER		87/90	87/91	86/89	88/92	85/89	89/97	87/92	87	78/84	89/96	92/96	88/89	82/89
NOVEMBER		87/89	87/90	85/85	87/95	82/89	82/91	86/94	86	79/86	88/93	91/95	87/89	81/88
DECEMBER		82/88	82/88	85/85	82/90	85/87	85/92	83/94	82	72/82	81/83	88/98	84/88	77/85

1972 - Ave. Min. Temp. /extreme

MONTH	YEAR	Landi- var	Bre. Int'l. Airport	Amber- gris Caye	Big Falls Ranch	Stann Creek Agstat	Savan- nah Forest	Cabbage Hual	August- ine	Cooma Cairn	Melinda Forest
JANUARY		73/67	71/65	75/67	67/65	66/61	69/64	73/52	63/56	62/55	73/70
FEBRUARY		70/63	68/57	73/63	66/55	63/53	62/61	72/63	62/50	59/49	71/62
MARCH		75/65	71/62	77/73	N.A.	64/60	68/62	71/62	63/60	63/57	71/60
APRIL		78/72	76/70	79/76	77/63	68/60	73/68	73/69	66/60	66/62	76/72
MAY		73/72	76/70	79/74	N.A.	70/66	74/70	73/70	69/62	67/62	77/74
JUNE		78/72	77/72	79/76	78/72	71/68	75/65	77/68	71/68	68/66	79/76
JULY		77/72	76/71	79/72	N.A.	71/66	75/70	76/68	69/64	67/64	78/74
AUGUST		77/72	76/73	79/75	N.A.	70/62	79/72	77/70	65/62	67/64	77/72
SEPTEMBER		76/72	75/71	79/73	76/71	70/68	74/71	78/71	65/62	67/64	77/76
OCTOBER		75/71	73/70	78/74	73/69	71/65	72/69	75/71	67/62	65/62	76/72
NOVEMBER		75/69	74/68	79/71	74/68	69/65	74/70	77/72	67/60	66/60	76/72
DECEMBER		70/62	69/60	73/62	69/69	67/64	70/58	71/61	62/50	61/52	72/62

SLAUGHTER RETURNS 1972

DISTRICT	CATTLE			PIGS		
	Number	Dressed Weight (lbs)	Average Dressed Weight	Number	Dressed Weight (lbs)	Average Dressed Weight
Belize	3,838	1,345,509	351	7,432	661,610	89.0
Cayo	398	106,386	267	770	63,314	82.2
Corozal	259	84,030	324	112	12,293	109.8
Orange Walk	328	102,416	312	1,020	112,951	109.7
Stann Creek	141	41,846	297	241	19,039	79.0
Toledo	40	13,317	333	327	21,916	67.0
Total	5,004	1,693,504	338	9,902	891,123	90.0

APPENDIX IV

DISEASE FOUND AT MEAT INSPECTION - 1972

<u>DISEASE</u>	<u>CATTLE</u>	<u>SPECIES PIGS</u>	<u>SHEEP</u>
Tuberculosis	3	15	-
Tumours benign (sample	3	30	-
Melanosis	2	471	-
Liver (a) Cirrhosis	30	1564	-
(b) Telangiectasis	91	179	4
(c) Fatty Infiltration	19	55	-
Abscesses Cloudy Swelling	66	139	2
Pneumonia	65	31	5
Metritis acute, septic	10	12	-
Parasitic Infection			
(a) Ascaris Lumbricoides	4	312	-
(b) Steph. dentatus	35	2487	-
(c) Cyst. Cellulosae	-	305	-
(d) Lung worms	32	1154	-
Icterus	-	-	-
Imperfect Bleeding	19	39	-
Congestion of lung	94	163	-
Bruising extensive and severe	111	26	-
Necrosis (a) Lungs	482	1298	-
(b) Liver	17	21	-
Hydronephrosis	32	73	1
Pyrexia	1	18	-
Nephritis	8	118	-
Nephrosis	2	39	-
Emphysema (Lung)	17	-	-

CLINICAL CASES - 1972

	<u>HORSES</u>	<u>CATTLE</u>	<u>SHEEP</u>	<u>PIGS</u>	<u>DOGS</u>	<u>CATS</u>	<u>POULTRY</u>	<u>OTHER</u>	<u>TOTAL</u>
Ectoparasites	8	207	9		49	1	-	2	276
Endoparasites	18	236	32	229	152	6	32	-	705
Enteritis	1	4	-	-	13	8	-	1	27

Anaplasmosis	-	111	-	-	-	-	-	-	111
Mastitis	-	7	-	-	-	-	-	-	7
Res. Infection	5	15	1	96	8	1	-	-	126
Eye Infection	2	5	-	3	11	1	9	-	31
Ear Infection	-	-	-	3	19	-	-	-	22
Allergy	-	-	-	-	8	-	-	-	8
Distemper	-	-	-	-	114	-	-	-	114
Leptospirosis	-	-	-	-	15	-	-	-	15
Fowl Cholera	-	-	-	-	-	-	S.F.	S.F.	
Photosensitization	-	2	-	-	-	-	-	-	2
Nephritis	-	-	-	-	2	-	-	-	2
Tonsillitis	-	-	-	-	2	-	-	-	2
Leukosis	-	-	-	-	-	-	-	1	1
Joint Ill	1	3	-	3	3	-	-	-	10
Abortion	1	3	-	2	-	-	-	-	6
Poisoning	-	8	-	-	7	-	-	-	15
Miscellaneous	62	298	108	299	345	8	940	2	2062
Vaccination									
(a) Rabies	-	54	-	-	117	3	-	-	174
(b) Distemper	-	-	-	-	86	1	-	-	87
(c) Swine Fever	-	-	-	481	-	-	-	-	481
(d) Leptospirosis	-	-	-	-	98	-	-	-	98
(e) Surgery	1	1	-	-	11	1	-	-	14
(a) Dystecia	2	-	-	-	-	-	-	-	2
(b) Retained Placenta	18	-	-	-	-	-	-	-	18
(c) Castrations	4	38	-	182	-	-	-	3	227
(d) Injury	20	7	-	6	55	-	1	-	89
(e) V.E.E.	189	-	-	-	-	-	-	-	189
Pregnancy Test	-	947	-	-	-	-	-	-	947
Total	321	1966	150	1304	116	30	982	8	5868

S.F. Several Flocks

Appendix IV (contd.)

LABORATORY EXAMINATIONS - 1972

EXAMINATION	HORSE	CATTLE	SHEEP	PIGS	DOGS	CATS	POULTRY	OTHER
Post Mortem	1	3	2	11	17	2	39	5 cats 4 rabbit 1 fox
<u>PARASITOLOGY</u>								
H. contortus		218/601	32/72					
Strongylus	43/53							
A. coninum					163/207	3/3		
Lung worms		10/37						
Ascaris spp.					7/207			
Monezia spp.		94/601	4/72					
Fluke		1/601						
Coccidia		49/601	6/72				5/39	
Heart worm					21/49			
Ascaridia galli							1/39	
Heterakis							1/39	
H. rubidis				2/6				
Trichuris volpis					3/207			
<u>BLOOD SMEARS</u>								
Anaplasma		55/162	0/2					
Babesia		10/162						
Atrophic Rhinitis				1/11				
<u>SEROLOGY</u>								
Brucella		3/293						
Leptospira					4/5			
<u>SKIN</u>								
Mange Demo.	0/5			1/4	6/35			
Blackhead							2/39	
Bacterial Cultures		6			4			
Total	59	1,094	76	21	317	5	78	10

Plot	Grass	284/4/57	9/5	11/7	16/8	20/10	11/12/57	31/1/63
G-1	Molopo Buffel	8.7	32.1	20.0	14.0	28.0	12.1	44.9
G-4	Nunbank Buffel	16.3	62.9	51.2	25.4	32.8	7.0	29.4
G-5	Jaragua	-	22.0	40.9	16.6	23.2	6.7	24.6
G-6	Big Bluestem	-	-	35.0	-	49.8	3.4	17.9
G-7	Camdeboo Buffel	-	32.0	-	-	-	9.2	19.9
G-8	Jaragua	7.7	26.9	29.7	12.3	14.8	7.8	21.2
G-9	Elephant	7.4	39.0	23.9	21.4	23.5	12.0	19.7
G-10	Bilcoela Buffel	11.2	-	27.4	17.9	21.2	14.4	23.7
G-11	Coloniao Guinea	7.7	26.5	29.1	20.0	23.2	4.5	17.6
G-12	Sweet grass	-	18.4	15.7	10.2	6.9	3.3	8.2
G-13	Hamil	13.5	41.7	31.6	20.3	40.1	12.7	22.6
G-14	Bambatsi	4.6	12.2	-	6.2	6.3	2.9	11.4
G-15	Kazungulu	-	-	13.9	3.5	11.1	5.8	16.0
G-16	Columbus	6.9	21.3	22.0	5.0	13.9	11.7	20.3
G-17	African Guinea	6.3	23.4	-	11.8	27.5	12.4	16.1
G-18	Nandi	-	-	10.7	-	16.3	2.2	9.8
G-19	Scorbie	-	8.6	5.7	3.4	-	6.6	-
G-20	Guinea	7.0	24.2	-	17.9	22.9	10.2	19.5
G-21	Pangola	-	-	29.8	21.5	-	10.7	15.5
G-22	Rodds Bay	-	12.3	9.7	5.6	12.2	-	-
G-23	Dallis	-	-	-	-	-	-	-
G-24	Arg. Bahia	-	-	5.1	-	-	-	-
G-25	Carib	-	88.2	34.8	23.5	53.7	17.1	25.0
G-26	Phodes	-	-	5.0	4.0	5.1	-	-
G-27	Arg. Bahia	-	-	3.6	-	-	-	-
G-28	Carib	-	15.6	33.9	13.4	27.4	13.6	27.9
G-29	Star	-	13.5	14.8	11.0	21.5	1.6	28.5
G-30	Pangola	-	-	8.4	12.7	-	6.0	14.8
G-31	Buffel	-	10.5	25.3	17.4	18.7	7.8	20.0
G-32	Elephant	9.4	33.3	13.2	12.5	17.9	16.8	23.3
G-33	Pensa. Bahia	-	-	-	-	-	-	-
G-34	Coastal Bermuda	-	10.3	22.3	16.9	24.6	3.7	-
G-35	Elephant	11.7	20.0	-	10.8	17.2	16.8	27.1
G-36	Aleman	-	-	14.9	10.6	6.2	2.9	9.8
G-37	Bluestem	17.4	-	47.8	-	88.6	4.2	29.6
G-38	Bluestem	8.7	-	30.3	-	52.1	3.5	21.0
G-39	Japanese	3.5	41.7	6.4	10.5	-	21.2	8.8
G-40	Merker	29.8	123.9	37.2	33.5	79.1	23.8	33.7
G-41	Merker	11.9	55.5	57.3	28.0	54.3	15.5	24.5
G-42	Japanese	-	13.9	-	-	-	21.2	6.6
G-43	Aleman	-	-	11.2	-	27.3	-	36.8
G-44	Merker	-	-	-	5.0	-	4.8	17.9
G-45	Molasses	-	39.3	-	15.0	-	15.2	-

Appendix V1 (contd.)

Plot	13/3/68	3/6	11/7	23/9	5/11	19/12/68	28/1/69
G-1	21.2	33.7	-	-	42.3	30.3	24.7
G-4	12.4	17.0	-	-	44.8	20.4	21.0
G-5	22.1	22.5	56.9	71.2	23.4	21.5	29.3
G-6	12.4	15.2	32.8	32.7	13.9	11.6	19.0
G-7	-	26.1	16.2	25.1	15.6	17.5	17.4
G-8	11.1	24.0	32.9	51.6	17.5	22.0	19.5
G-9	-	33.2	30.8	32.9	13.1	12.4	15.6
G-10	10.5	18.8	30.4	26.9	24.2	18.0	21.2
G-11	-	28.6	31.7	32.3	10.7	3.3	11.2
G-12	-	9.3	17.1	13.5	8.7	8.0	14.5
G-13	11.5	36.6	32.6	48.9	21.5	17.6	6.2
G-14	-	11.1	30.5	11.2	7.8	-	13.8
G-15	-	16.4	28.4	10.4	7.5	-	15.5
G-16	9.9	13.5	29.0	16.5	14.2	7.7	15.2
G-17	9.1	20.9	33.8	30.4	18.5	10.4	20.5
G-18	6.4	9.2	10.7	7.7	4.1	4.0	11.5
G-19	-	7.9	13.3	9.4	-	6.2	-
G-20	-	20.4	26.5	23.1	14.7	12.1	21.7
G-21	-	16.9	53.6	25.2	13.2	16.2	-
G-22	-	16.1	21.6	22.9	12.9	-	8.6
G-23	-	-	-	-	17.8	6.8	-
G-24	-	9.0	18.7	25.4	10.7	-	18.3
G-25	17.6	21.6	53.2	26.1	19.2	16.3	28.8
G-26	3.5	7.3	11.7	7.6	6.8	-	5.2
G-27	-	20.5	18.1	32.3	12.7	-	12.7
G-28	15.4	14.6	24.5	24.4	20.3	14.1	10.7
G-29	10.5	10.6	28.2	20.5	12.9	4.1	16.4
G-30	-	13.4	23.3	21.5	8.3	7.0	13.4
G-31	-	19.00	32.0	20.2	15.4	14.2	14.4
G-32	-	22.1	29.4	28.4	15.1	9.8	17.2
G-33	-	5.2	11.7	17.2	5.1	-	13.9
G-34	22.7	13.2	30.6	21.6	15.7	7.5	14.0
G-35	-	11.3	50.5	13.4	12.6	12.3	22.2
G-36	-	7.3	19.8	9.8	6.6	-	14.0
G-37	41.5	18.0	24.8	38.0	21.8	12.0	15.4
G-38	-	25.6	21.4	51.1	13.9	12.1	19.1
G-39	-	12.8	13.6	5.8	-	-	27.2
G-40	22.6	87.6	62.0	89.4	56.5	-	36.4
G-41	38.8	52.8	54.1	56.8	28.5	11.9	23.9
G-42	-	8.9	15.3	8.0	-	-	14.5
G-43	-	10.6	26.3	19.5	10.4	5.9	10.1
G-44	-	22.2	39.5	37.1	27.4	-	18.9
G-45	23.2	6.5	21.1	6.5	-	9.3	-

Appendix Vll

PASTURE INTRODUCTION PLOTS -- TOTAL
CRUDE PROTEIN YIELD (CWT/ACRE)

Plot	28/4/67	9/6	11/7	16/8	20/10	11/12	31/1/68	13/3
G-1	0.7	2.6	1.6	1.1	2.1	1.6	4.9	1.9
G-4	1.2	4.8	3.3	1.7	2.6	1.0	2.6	1.1
G-5	-	1.4	2.2	1.2	2.1	0.5	2.0	1.5
G-6	-	-	1.8	-	5.0	0.3	1.9	0.9
G-7	-	2.3	1.0	1.0	2.1	1.1	2.2	-
G-8	0.3	2.7	2.4	1.0	1.4	0.6	2.0	0.7
G-9	0.7	2.9	2.4	1.9	2.5	1.1	1.9	-
G-10	0.8	-	2.4	1.4	2.1	1.7	2.4	0.8
G-11	0.5	2.2	1.5	1.4	2.2	0.5	1.9	-
G-12	-	1.4	1.6	1.1	1.0	0.5	1.2	-
G-13	1.3	3.7	2.5	1.5	3.0	1.4	1.4	-
G-14	0.5	1.0	-	0.5	0.8	0.4	2.6	1.0
G-15	-	-	0.5	0.3	1.3	0.7	1.8	-
G-16	0.3	1.7	2.1	0.4	1.5	1.2	2.1	0.7
G-17	0.7	1.6	-	1.2	3.0	1.2	1.9	0.8
G-18	-	-	0.6	-	0.9	0.4	1.3	0.8
G-19	-	-	-	-	-	-	-	-
G-20	0.4	2.1	-	1.4	2.2	1.1	2.0	-
G-21	-	-	2.4	1.5	-	1.0	1.6	-
G-22	-	1.1	0.8	0.5	1.2	-	-	-
G-23	-	-	-	-	-	-	-	-
G-24	-	-	6.6	-	-	-	-	-
G-25	-	5.9	3.4	1.6	6.1	1.6	2.4	1.2
G-26	-	-	0.6	0.4	0.6	-	0.4	0.3
G-27	-	-	0.3	-	-	-	-	-
G-28	-	5.1	2.7	1.5	3.1	1.3	2.7	1.1
G-29	-	2.3	1.5	0.7	1.8	0.2	2.4	0.7
G-30	-	-	0.8	0.8	-	0.6	1.6	-
G-31	-	2.3	1.7	1.1	1.5	0.8	1.4	-
G-32	0.8	2.1	1.1	1.1	1.8	2.2	1.7	-
G-33	-	-	-	-	-	-	-	-
G-34	-	4.0	1.6	1.8	2.3	0.4	2.3	1.5
G-35	0.8	1.5	-	1.0	1.7	2.2	2.0	-
G-36	-	-	1.6	0.8	0.6	0.7	1.1	-
G-37	0.9	-	3.2	-	4.0	0.5	1.9	2.1
G-38	0.4	-	1.5	-	2.3	0.3	1.4	-
G-39	0.3	2.2	0.6	0.9	-	2.4	1.0	-
G-40	3.4	16.3	4.3	3.6	10.2	3.7	4.0	2.3
G-41	1.1	7.5	6.1	2.9	6.3	2.4	2.9	3.4
G-42	-	0.9	-	-	-	2.4	0.8	-
G-43	-	-	0.9	-	1.8	-	3.8	-
G-44	-	-	-	0.4	-	0.7	1.8	-
G-45	-	2.3	-	0.7	-	1.3	-	1.2

Plot	3/6/68	11/7	23/9	5/11	19/12	28.1/69	Total	Average	No. cuts
G-1	3.1	-	-	0.9	1.5	1.3	23.3	1.9	12
G-4	1.7	-	-	1.5	1.1	0.9	23.5	2.0	12
G-5	1.8	3.5	2.3	1.1	0.8	1.5	21.9	1.7	13
G-6	1.3	1.6	1.2	0.5	0.6	1.1	16.2	1.5	11
G-7	2.4	1.3	1.5	0.6	1.1	1.4	18.0	1.5	12
G-8	1.8	2.1	1.6	0.6	1.2	1.4	19.8	1.4	14
G-9	2.7	2.8	2.2	0.7	0.6	1.3	23.7	1.8	13
G-10	1.9	1.9	0.9	1.0	1.0	1.1	19.4	1.5	13
G-11	2.5	3.0	2.0	0.5	0.2	1.0	19.4	1.5	13
G-12	1.2	1.9	1.0	0.4	0.6	1.2	13.1	1.1	12
G-13	1.0	1.8	0.8	0.4	1.2	0.5	8.5	2.0	14
G-14	3.5	2.6	2.8	0.9	-	0.7	10.3	1.5	11
G-15	1.6	2.5	0.8	0.3	-	0.6	10.4	1.0	10

Appendix VII (contd.)

G-16	1.1	2.4	0.6	1.2	0.4	1.2	16.9	1.2	14
G-17	1.8	3.7	1.4	1.5	0.7	1.3	20.8	1.6	13
G-18	1.1	1.4	0.7	0.2	0.4	1.0	8.8	0.8	11
G-19	-	-	-	-	-	-	-	-	-
G-20	1.7	2.5	1.4	1.1	0.6	1.5	17.9	1.5	12
G-21	1.6	2.6	1.7	0.7	0.9	-	14.0	1.6	9
G-22	2.1	2.2	1.6	0.7	-	0.5	10.7	1.2	9
G-23	-	-	-	0.6	0.3	-	0.9	0.5	2
G-24	0.7	1.5	1.4	0.5	-	1.0	5.7	1.0	6
G-25	2.7	2.7	2.1	0.9	0.8	1.7	33.1	2.5	13
G-26	0.6	0.8	0.4	0.5	-	0.3	4.9	0.5	10
G-27	1.5	1.4	1.9	0.8	-	0.8	6.7	1.1	6
G-28	2.0	2.0	1.4	1.3	0.8	0.7	25.7	2.0	13
G-29	1.0	1.7	1.6	0.5	0.2	1.1	15.7	1.2	13
G-30	1.2	1.8	1.3	0.4	0.4	0.9	9.8	1.0	10
G-31	1.2	1.4	1.0	0.5	0.6	0.9	14.4	1.2	12
G-32	1.6	2.5	2.3	0.8	0.5	1.0	19.5	1.5	13
G-33	0.8	1.3	1.2	0.8	-	0.8	4.4	0.9	5
G-34	1.3	1.8	1.2	0.7	0.4	0.8	19.5	1.5	13
G-35	1.0	4.1	1.3	1.0	0.7	1.6	17.9	1.5	12
G-36	0.8	1.2	0.7	0.3	-	0.5	8.3	0.8	10
G-37	1.5	1.3	1.6	0.9	0.7	1.0	19.7	1.6	12
G-38	1.1	1.4	3.0	0.5	0.6	1.0	13.5	1.2	11
G-39	0.9	2.0	0.4	-	-	1.8	12.5	1.3	10
G-40	8.6	8.4	7.1	2.6	-	2.2	76.7	5.9	13
G-41	4.2	5.6	3.6	1.7	0.6	1.6	48.9	3.5	14
G-42	0.7	1.0	0.6	-	-	1.1	7.5	1.1	7
G-43	0.9	2.1	0.7	0.4	0.3	0.5	11.4	1.3	9
G-44	2.3	4.8	2.3	1.4	-	1.3	15.0	1.9	8
G-45	0.7	1.0	0.5	-	0.4	-	8.1	1.0	8

Pasture Introduction Block - Dry Weight Yield (Cwt/acre)

Plot	3/6/68	11/7	23/9	5/11	10/12/68	28/1/69
G-19 Scrobic	7.9	13.3	9.4	6.2	6.2	-
G-46 Paspalum	-	-	-	13.2	-	-
G-47 Kazungulu	68.3	53.2	10.9	8.4	6.7	13.2
G-48 Green Panic	27.1	26.7	10.3	11.4	5.7	14.2
G-49 Biloela Buffel	12.3	23.2	28.5	28.4	22.4	13.0
G-50 Creeping Guinea	36.0	-	-	10.0	-	10.2
G-51 Gatton Panic	23.1	25.1	7.7	8.2	4.2	18.6
G-52 Piano	31.4	-	-	27.2	-	15.6

G-53 Buffel	G-58 Kikuyu	G-62 Ruzi	G-66 Plicatulum
G-54 Buffel	G-59 Signal	G-63 Scrobic	G-67 Rhodes
G-55 Napier	G-60 Embu	G-64 Pasto Rico	G-68 U.S. Buffel
G-56 Buffel	G-61 Lovington	G-65 Tarri Buf- fel	G-69 Aleman
G-57 Buffel			

Plot	9/4/69	7/8	24/9	12/11	22/1/70	10/3	1/5	16/7	25/8
G-19	-	19.2	5.8	4.9	5.7	-	3.9	33.9	15.8
G-46	-	34.8	16.8	16.9	12.7	14.8	15.2	47.7	20.9
G-47	17.5	-	-	-	-	-	-	-	-
G-48	14.7	21.3	5.8	4.9	5.7	5.7	19.8	24.0	11.2
G-49	-	47.9	27.5	25.2	26.4	16.0	14.9	35.1	27.5
G-50	16.5	17.5	11.9	4.7	7.1	7.9	11.3	14.1	5.4
G-51	10.9	12.5	6.1	4.7	2.6	6.2	6.1	20.8	15.2
G-52	70.9	21.1	17.9	-	21.0	4.0	5.8	11.4	11.6
G-53	-	-	17.9	-	6.7	10.1	14.4	17.6	13.6
G-54	-	-	5.8	3.3	5.9	4.7	5.2	8.1	4.9
G-55	39.0	87.6	33.7	16.7	19.6	-	17.7	30.3	35.7
G-56	-	-	14.2	9.6	13.4	9.5	8.3	20.3	14.8
G-57	-	-	-	4.0	-	-	-	-	-
G-58	-	-	-	-	20.7	-	-	-	13.1
G-59	-	20.2	27.6	11.3	23.2	19.6	12.2	37.4	15.6
G-60	-	47.6	14.3	-	5.2	-	3.6	5.2	-
G-61	-	12.3	8.9	5.9	4.4	5.3	3.2	11.3	8.4
G-62							7.8	36.7	8.5
G-63							-	23.8	5.0
G-64							-	-	-
G-65						40.4	32.8	49.3	31.3
G-66						9.9	11.1	36.2	17.4
G-67						19.4	13.9	20.6	7.2
G-68						5.0	-	18.2	2.2
G-69						15.5	-	-	-

Plot	2/10/70	7/12	26/1/71	20/4	8/7	18/8	9/12	15/3/72
G-19	15.9	12.9	5.7	6.1	3.9	14.0	6.0	15.1
G-46	30.6	30.2	18.8	10.0	20.3	29.9	25.0	13.7
G-48	13.1	14.9	8.3	12.0	11.2	17.2	13.3	10.0
G-49	27.7	24.6	18.0	19.1	13.8	24.6	24.8	20.7
G-50	9.7	8.7	11.7	11.1	-	18.4	6.9	6.9
G-51	15.7	16.2	8.6	9.0	6.2	11.5	8.3	5.7
G-52	31.3	16.2	12.5	3.1	8.3	8.4	12.0	11.7
G-53	21.7	17.7	12.9	15.5	13.1	17.3	11.1	11.9
G-54	9.8	9.6	6.4	10.0	8.4	11.7	10.8	13.3
G-55	24.5	24.6	22.6	21.7	12.8	12.1	15.9	-
G-56	16.4	18.3	11.9	13.7	7.4	12.0	11.8	17.1
G-57	10.2	9.9	6.5	9.9	7.8	12.0	10.5	10.7
G-58	-	15.0	5.9	5.1	-	-	-	-
G-59	28.2	33.0	22.5	33.3	32.4	13.1	22.1	23.4
G-60	3.7	5.1	3.8	7.1	-	6.2	6.0	10.3
G-61	8.2	8.4	-	-	1.0	3.6	1.5	4.0
G-62	31.3	13.8	12.1	9.4	8.8	15.2	7.7	8.4

Appendix VIII (Continued)

G-63	7.4	4.8	2.5	-	-	-	-	-
G-64	-	-	-	-	1.0	6.3	5.6	7.0
G-65	42.2	34.6	20.3	20.5	22.3	32.0	20.5	10.1
G-66	24.0	19.2	5.7	8.2	15.3	23.9	14.0	10.6
G-67	8.2	14.3	8.2	16.7	2.0	2.4	2.5	7.0
G-68	11.4	4.1	3.0	4.2	2.3	6.4	4.2	3.4
G-69	-	18.4	11.5	-	-	-	3.4	6.1

Plot	3/6/68	11/7	23/9	5/11	19/12	28/1/69	9/4	7/8	24/9
G-19	1.0	1.4	0.3	-	0.3	-	-	1.4	0.5
G-46	-	-	-	0.8	-	-	-	2.3	1.6
G-47	3.2	2.6	0.7	0.5	0.4	0.9	1.2	-	-
G-48	1.8	1.2	0.6	0.4	0.3	0.6	1.0	1.1	-
G-49	1.3	1.6	1.8	1.2	1.2	1.1	-	2.2	1.5
G-50	3.3	-	-	0.4	-	0.8	1.1	1.1	0.8
G-51	1.8	1.2	0.5	0.5	0.3	1.5	0.8	0.8	0.4
G-52	3.1	-	-	0.8	-	0.5	4.0	0.7	1.1
G-53							-	-	0.8
G-54							-	-	0.3
G-55							3.5	6.2	0.7
G-56							-	-	0.7
G-57							-	1.0	1.2
G-60							-	1.8	0.9
G-61							-	1.2	0.8

Plot	12/11/69	22/1/70	19/3	1/6	16/7	Total	Average/cut
G-19	0.3	0.4	-	0.4	2.8	8.9	0.7
G-46	1.0	0.7	1.0	1.3	2.9	11.6	1.4
G-47	-	-	-	-	-	9.5	1.3
G-48	0.4	0.3	0.3	0.8	1.1	9.9	0.7
G-49	1.4	0.9	0.7	1.1	2.0	18.0	1.4
G-50	0.4	0.4	0.5	0.9	1.0	10.7	0.9
G-51	0.3	0.2	0.3	0.5	1.5	10.6	0.7
G-52	-	0.7	0.2	0.4	0.9	12.4	1.2
G-53	-	0.3	0.7	0.9	1.2	3.9	0.8
G-54	0.2	0.2	0.2	0.3	0.7	1.9	0.3
G-55	12.	1.0	-	1.4	2.1	18.1	2.6
G-56	0.4	0.6	0.5	0.5	1.3	4.0	0.6
G-57	0.2	-	-	-	-	0.2	-
G-58	-	1.2	-	-	-	1.2	-
G-59	0.7	1.0	1.1	0.7	2.0	7.7	1.1
G-60	-	0.2	-	0.3	0.3	3.5	0.7
G-61	0.6	0.5	0.6	0.3	1.2	5.2	0.7
G-62			-	0.7	2.2	2.9	-
G-63			-	-	1.4	1.4	-
G-64			-	-	-	-	-
G-65			4.4	1.8	3.1	9.3	-
G-66			0.6	1.1	2.9	4.6	-
G-67			0.6	0.7	1.1	2.4	-
G-68			0.4	-	0.3	0.7	-
G-69			0.3	-	-	0.3	-

Appendix X Pasture Introduction Blocks - Dry Weight Yield (cwt/acre)

Plot	11/7/67 828/8"	20/108 11/12"	133/68" 83/6	11/7	23/9	5/11
L-1 Perennial Stylo	-	15.4	26.7	-	-	-
L-3 Local Vigna	38.3"	9.9	-	-	-	14.1
L-4 Annual Stylo	-	-	-	-	-	-
L-5 Hairy Indigo	-	51.1	-	-	-	-
L-9 <u>Clitoria ternatea</u>	-	6.6"	10.5	2.31	16.1	9.5
L-14 <u>Glycine javanica</u>	6.5	-	-	-	4.4	-
L-18 Centrosema	34.8	24.2"	20.1	18.1	10.8	6.0
L-19 Dolicho axillaris	-	-	-	10.0	9.6	-
L-20 Dolicho axillaris				23.0	18.0	9.2
L-21 Dolicho Axillaris				16.8	13.0	5.2
L-24 Cooper Glycine	15.5	-	-	-	-	-
L-25 Clarence Glycine				7.3	9.9	7.1
L-26 Clarence Glycine				12.6	15.4	8.5
L-27 Clarence Glycine				10.5	5.5	4.1
L-28 Clarence Glycine				10.7	9.9	6.9
L-29 Teramnus uncinatus				22.0	7.0	-
L-30 Teramnus uncinatus				-	7.7	9.4
L-32 Tropical Kudzu		30.0	27.5	5.0	6.3	-
L-34 Vigna marina				16.9	-	1.80
L-35 Siratro			12.3	24.2	10.0	-
L-36 Siratro				17.7	18.5	-
L-37 Centrosema			22.0	-	-	-
L-38 Centrosema			25.4	20.2	12.9	28.2
L-39 Greenleaf Desmodium			13.3"	16.9	-	-
L-40 Centrosema			30.5	23.7	17.2	15.9
L-41 Glycine Cooper				13.8	7.9	-
L-45 Centrosema		5.2	-	17.1	18.4	-

Plot	19/12/68	28/1/69	9/4	7/8	24/9	12/11	19/3/70	28/7/70
L-3				22.2			5.3	
L-4				48.9				
L-9		6.2						
L-14		4.8	5.4				5.6	
L-18		4.6	12.0	27.5	6.7	6.5	5.2	27.6
L-19	4.4	-						
L-20		6.1	5.4					
L-21		3.9						
L-25		4.9			4.8			
L-26		10.2			6.2			
L-27					8.6			
L-28		3.1			3.1			
L-29		11.9			13.5			
L-30		4.6						

Appendix X (Contd.)

L-32	12.9		29.5	-	24.7	20.0	27.3
L-34			18.8				
L-35	12.0		24.8	7.9	8.1	9.2	9.1
L-36	6.1	9.3	14.2	7.3	4.5	4.1	10.6
L-38	5.8	16.9	22.4	-	20.7	-	18.6
L-39	8.2						
L-40	7.2	34.7	24.8	7.6	12.9		
L-41	5.6						
L-45	10.8	19.7	23.4	7.3	7.2	4.1	

L-30								3.0	1.0
L-32	5.5		3.2		3.1		3.7	30.6	3.4
L-34	3.3							8.7	2.9
L-35	3.1	1.3	1.3		1.2	1.3	1.2	19.0	2.1
L-36	2.3	1.0	0.7		0.5		1.2	14.1	1.6
L-37								5.2	5.2
L-38	4.9		4.7			5.4	3.5	34.7	3.9
L-39								5.1	1.7
L-40	5.3	1.4	2.8			1.3		38.6	4.3
L-41								4.2	1.4
L-45	4.8	1.8	1.8		0.8	2.0		22.4	2.5

Appendix XI

Pasture Introduction Blocks - Total Crude Protein (cwt/acre)

Plot	11/7/67 8/6/8	20/108 11/12	3/6/68	11/7	23/9	5/11	19/12	28/1/69	9/4/69
L-1	0.01	3.4	4.2						
L-3	7.5	2.8				2.6			
L-5		5.3							
L-9		1.7	2.6	5.8	3.8	1.4		0.9	
L-14	1.2				0.7			0.5	0.9
L-18	7.1	6.3	0.5	4.9	2.7	0.9		0.6	2.2
L-19				1.7	1.7		0.4		
L-20				3.5	3.1	0.8		0.5	0.9
L-21				2.6	2.0	0.9		0.3	
L-24	2.3								
L-25				1.3	3.1	0.7		0.4	
L-26				2.4	2.8	1.0		1.1	1.4
L-27				1.9	1.2	0.5			
L-28				1.9	1.7			0.3	
L-29				3.8	1.2			0.7	
L-30					1.5	1.0		0.5	
L-32			4.6	0.8	1.1		1.1		
L-34			3.5			1.9			
L-35			3.0	5.6			1.0		
L-36				2.9	3.9		0.5		1.1
L-37			5.2						
L-38			5.0	5.0	2.6		0.5		3.1
L-39			1.7	2.7			0.7		
L-40			8.5	6.3	3.3	2.6			7.1
L-41				2.5	1.3		0.4		
L-45				3.8	2.7				3.2

[illegible]

